



1. Salmon, 2. Lamprey, 3. Pike, 4. Sturgeon, 5. White Shark, 6. Torpedo, 7. Sting Ray.

ANIMAL BIOGRAPHY,

OR,

POPULAR ZOOLOGY;

ILLUSTRATED BY

AUTHENTIC ANECDOTES

OF

THE ECONOMY, HABITS OF LIFE, INSTINCTS, AND SAGACITY

OF THE

Animal Creation.

BY THE

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IN FOUR VOLUMES.

SEVENTH EDITION.

VOL. III.

BIRDS—AMPHIBIOUS ANIMALS—FISHES.

LONDON:

PRINTED FOR C. J. G. AND F. RIVINGTON; LONGMAN, REES, ORME, BROWN, AND GREEN; JEFFERY AND SON; HARVEY AND DARTON; T. CADELL; HATCHARD AND SON; R. SCHOLEX; BALDWIN AND CRADOCK; J. HOOKER; HURST, CHANCE, AND CO.; HAMILTON, ADAMS, AND CO.; WHITTAKER, TREACHER, AND ARNOT; J. DUNCAN; SIMPKIN AND MARSHALL; HARDING AND LEPAUD; SHERWOOD, GILBERT, AND PIPER; HOULSTON AND SON; AND G. AND J. ROBINSON, LIVERPOOL.

1849.

ANIMAL BIOGRAPH

Gallinaceous Birds*

OF THE TURKEY TRIBE IN GENERAL.

Belonging to the present tribe, two species only have hitherto been discovered; one in America, and the other in the more retired parts of India. In each of them the bill is ~~convex~~, short, and strong. The head and neck, or throat, and in some of the species all three, are covered with naked & unculatated or warty flesh, the skin of which is flaccid and membranaceous. The tail is broad, and the birds have the power of expanding it.

THE AMERICAN OR COMMON TURKEY†.

The hunting of these birds forms one of the principal diversions of the natives of Canada. When they have discovered the retreat of a flock of Turkeys, which in general is near fields of nettles, or where there is plenty of any kind of grain, they send a well-trained dog into the midst of the flock. The birds no sooner perceive their enemy, then they run off at full speed, and with such swiftness, that they leave the dog far behind. He, however, follows; and at last forces them

* In the birds of this order the bill is convex, the upper mandible lying in an arch over the lower one; and the nostrils are arched over with a cartilaginous membrane. The feet are formed for running, without a back toe; and the toes are rough underneath.

† SYNONYMS. *Meleagris Gallo-pavo*. *Linnaeus*.—*Dindon*. *Buffon*.—New England Wild Turkey. *Ray*.—*Bcw. Birds*, p. 286.

to take shelter in a tree; where they sit, spent and fatigued, till the hunters come up, and with long poles knock them down one after another.

Turkeys were first introduced from North America into England in the reign of Henry the Eighth. According to Tusser's "Five Hundred Pointes of good Husbandrie," they began about the year 1585 to form an article in our rural Christmas feasts :

Beefe, mutton, and pork, shred pies of the best,
Pig, veale, goose, and capon, and *turkie* well drest,
Cheese, apples, and nuts, jolly carols to heare,
As then in the countrie is counted good cheare.

These birds, among themselves, are extremely furious; and yet against other animals they are generally weak and cowardly. The domestic cock often makes them keep at a distance; and they seldom venture to attack him but with united force, when the cock is rather oppressed by their weight, than annoyed by their weapons. There have, however, occurred instances in which the Turkey-cock has not been found wanting in prowess:—A gentleman of New York received from a distance a Turkey-cock and hen, and a pair of bantams, which he put into his yard with other poultry. Some time afterwards, as he was feeding them from the barn-door, a large hawk suddenly turned the corner of the barn, and made a pitch at the Bantam-hen. She immediately gave the alarm, by a noise which is natural to poultry on such occasions. On hearing this, the Turkey-cock, which was at a little distance, and no doubt understood the hawk's intentions, and the imminent danger of his old acquaintance, flew at the tyrant with such violence, and gave him so severe a stroke with his spurs when about to seize his prey, as to knock him from the hen to a considerable distance; and the timely aid of this faithful auxiliary saved the bantam from being devoured.

To this I can add another instance (though very dif-

ferent in its nature) of the gallantry of the Turkey-cock. In the month of May, 1798, a female Turkey, belonging to a gentleman in Sweden, was sitting upon eggs; and as the cock, in her absence, began to appear uneasy and dejected, he was put into the place with her. He immediately sat down by her side; and it was soon found that he had taken some eggs from under her, and had himself sat upon them. The eggs were put back, but he soon afterwards took them again. This induced the owner, by way of experiment, to have a nest made, and as many eggs put into it as it was thought the cock could conveniently cover. The bird seemed highly pleased with this mark of confidence; he sat with great patience on the eggs, and was so attentive to the care of hatching them, as scarcely to afford himself time to take the food necessary for his support. At the usual period, twenty-eight young-ones were produced: and the cock, which was in some measure the parent of this numerous offspring, appeared perplexed on seeing so many little creatures picking around him, and requiring his care. He was not, however, trusted with the rearing of the brood, lest he should neglect them; and they were reared by other means.

The disposition of the female Turkey is in general much more mild and gentle than that of the male. When leading out her young family to collect their food, though so large and apparently so powerful a bird, she gives them very little protection against the attacks of any rapacious animal that comes in her way. She rather warns them to shift for themselves, than prepares to defend them. "I have heard a Turkey-hen, when at the head of her brood, (says the Abbé de la Pluche,) send forth the most piteous scream, without my being able to perceive the cause: her young-ones, however, immediately when the warning was given, skulked under the bushes, the grass, or whatever else seemed to offer shelter or protection. They even stretched themselves at full length on the ground, and

continued lying motionless as if dead. In the mean time the mother, with her eyes directed upwards, continued her cries and screaming as before. On looking up, in the direction in which she seemed to gaze, I discovered a black spot just under the clouds, but was unable at first to determine what it was; however, it soon appeared to be a bird of prey, though at first at too great a distance to be distinguished. I have seen one of these animals continue in this agitated state, and her whole brood pinned down as it were to the ground, for four hours together; whilst their formidable foe has taken his circuits, has mounted, and hovered directly over their heads: at last, upon his disappearing, the parent changed her note, and sent forth another cry, which in an instant gave life to the whole trembling tribe, and they all flocked round her with expressions of pleasure, as if conscious of their happy escape from danger."

It appears that in the wilds of America the Turkey grows to a much larger size than with us. Josselyn says, that he has eaten part of a Turkey-cock which, after it was plucked and the entrails were taken out, weighed thirty pounds. Lawson, whose authority is unquestionable, saw half a Turkey serve eight hungry men for two meals, and says that he had seen others which he believed would each weigh forty pounds. Some writers assert that instances have occurred of Turkeys weighing sixty pounds.

The females lay their eggs in spring, generally in some retired and obscure place; for the cock, enraged at the loss of his mate while she is employed in hatching, is apt otherwise to break them. They sit on their eggs with so much perseverance, that, if not taken away, they will sometimes perish with hunger rather than leave the nest. They are exceedingly affectionate to their offspring.

Turkeys are bred in great numbers in Norfolk, Suffolk, and some other counties, whence they are driven to the London markets in flocks of several hundreds.

The drivers manage them with great facility, by means of a long stick with a bit of red rag tied to the end of it, which, from the antipathy these birds bear to that colour, effectually answers the purpose of a scourge.

In a wild state Turkeys are gregarious; and associate in flocks, consisting sometimes of more than five hundred. They frequent the great swamps of America to roost; but they leave these at sun-rise, to repair to the dry woods in search of acorns and berries. They perch on trees, and gain the height they wish by rising from bough to bough; and they generally mount to the summits of even the loftiest trees, so as to be beyond musket-shot. They run very swiftly, but they fly awkwardly; and about the month of March they become so fat that they cannot fly beyond three or four hundred yards, and are then easily run down by a horseman.

It is seldom indeed that wild Turkeys are now seen in the inhabited parts of America; and they are only found in great numbers, in the distant and most unfrequented parts. If the eggs of wild Turkeys be hatched under the tame birds, the offspring are said still to retain a certain degree of wildness, and to perch separate from the others; yet they will mix and breed together in the season.

The Indians make an elegant clothing of the feathers of Turkeys. They twist the inner webs into a strong double string with hemp, or with the inner bark of the mulberry-tree, and work it like matting. This appears very rich and glossy, and as fine as silk shag. The natives of Louisiana make fans of the tail; and of four tails joined together, the French used formerly to construct a parasol.

OF THE PEACOCK TRIBE IN GENERAL.*

There are only four known species of Peacocks.

* The bill is strong and convex. The head is covered with

These are birds, for the most part, of large size. They feed on insects, fruit, and grain. One of them (the common kind) is an inhabitant of Asia and Africa, another of China, the third of Thibet, and the fourth of Japan.

THE CRESTED OR COMMON* PEACOCK*.

If, says M. de Buffon, empire were claimed by beauty, and not by power, the Peacock would, without contradiction, be the king of birds. For elegance of form, and brilliancy of plumage, it is exceeded by none of the feathered race. On the Peacock it is that nature appears to have bestowed her treasures with the greatest profusion. Its large size, imposing manner, firm tread, and noble figure: the rich crest upon its head, adorned with brilliant colours: its matchless plumage, appearing to combine every thing that can delight the eye—all contend to place it high in our esteem. These beautiful plumes, however, are shed every year. At this period the bird seems humiliated; and searches the shades, in order to conceal himself from our eyes until a new spring restores to him his usual attire.

The brilliant train of the Peacock is not its tail: the long feathers that form it do not grow from the rump, but upon the back. A range of short, brown, stiff feathers, fixed upon the rump, is the real tail, and serves as a support to the train. When the train is elevated, nothing appears of the bird in front, except its head and neck; but this would not be the case, were those long feathers fixed only on the rump. By

feathers which bend backward. The nostrils are large. The feathers of the train are long, broad, expansile, and covered with eye-like spots.

* SYNONYMS. *Pavo cristatus*. *Linnaeus*.—*Le Paon*. *Buff.*
—*Bew. Birds*, v. ii. p. 239.

a strong muscular vibration, these birds can make the shafts of their long feathers clatter together like the swords of a sword-dancer.

Peacocks are found wild in Asia and Africa; but the largest and finest of these birds are seen in the neighbourhood of the Ganges, and in the fervid plains of India. They are mentioned in the Sacred Writings, where they are enumerated as constituting part of the cargoes of the fleet which imported the treasures of the East to the court of Solomon.

These birds were highly esteemed by the Romans. Pliny states, that the first Roman who ordered Peacocks to be served up at his table, was Hortensius, in a grand entertainment which he gave when he was consecrated high priest. Marcus Aufidius Lurco was the first who attempted to fatten these birds in a manner which was peculiar to himself, and by which he is said to have derived an annual income of more than 60,000 sesterces.

The females lay only a few eggs at a time, and these at a distance of usually three or four days from each other. When they are at liberty and act from natural instinct, they always deposit their eggs in some sequestered or secret place. These are white and spotted, like the eggs of the turkey. The incubation occupies from twenty-seven to thirty days, according to the temperature of the climate and of the season.

As Peacocks, in this country, are not able to fly well, they climb from branch to branch, to the tops of the highest trees. From these, and from the roofs of houses, it is, that they usually make their harsh and very peculiar cry. In this cry, one note is deep and the other sharp, the latter exactly an octave above the former; and both have somewhat of the piercing sound of a trumpet.

The females of this species, like those of the pheasant, have sometimes been known to assume the plumes of the male. Lady Tynte had a favourite pied peahen, which eight times produced chicks. Having

moulted when about eleven years old, the lady and her family were astonished to see her display the feathers that are peculiar to the other sex, and appear like a pied Peacock. In the following year she moulted again, and produced similar feathers. In the third year she did the same, and then had also spurs resembling those of the cock. The hen never bred after this change of her plumage.

OF THE PHEASANT TRIBE IN GENERAL*.

•The females of this tribe produce many young-ones at a brood: these they take care of for some time, leading them abroad, and pointing out food for them. The nests of the whole tribe are formed on the ground.

THE COMMON PHEASANT†.

This beautiful bird is very common in almost all the southern parts of the Old Continent, whence it was originally imported into our country. In America it is not at all known.

Pheasants are much attached to the shelter of thickets and woods, where the grass is long; but, like partridges, they likewise breed in clover-fields. They form their nests on the ground: and the females lay from twelve to fifteen eggs, which are smaller than those of the domestic hen. In the mowing of clover near woods that are frequented by Pheasants, the destruction of their eggs is sometimes very great. In some places, therefore, game-keepers have directions to

* The characters of the present tribe are a short, convex, and strong bill; the head more or less covered with carunculated bare flesh on the sides, which in some species is continued upwards to the crown, and beneath so as to hang pendent under each jaw; and the legs in most of the species are furnished with spurs.

† SYNONYMS. *Phasianus colchicus*. Linn.—Faisan. Buff.—*Bew. Birds*, p. 282.

hunt the birds from these fields as soon as they begin to lay, until their haunt is broken, and they retire into the corn. Poultry hens are often kept ready for sitting on any eggs that may be exposed by the scythe ; and, with care, great numbers are thus rescued from destruction. The nest of the Pheasant is usually composed of a few dry vegetables put carelessly together ; and the young-ones follow their mother, like chickens, as soon as they break the shell. The parents and their brood, if undisturbed, remain in the stubbles and hedgerows, for some time after the corn is ripe. If disturbed, they seek the woods, and only issue thence in the mornings and evenings, to feed among the stubbles. These birds are fond of corn ; but can procure a subsistence without it ; since they often feed on the wild berries of the woods, and on acorns.

In confinement the female Pheasant neither lays so many eggs, nor hatches nor rears her brood with so much care and vigilance, as in the fields out of the immediate observation of man. Indeed, in the business both of incubation and rearing the young-ones, the domestic hen is generally made a substitute for the hen Pheasant.

The wings of these birds are short, and ill adapted for considerable flights. On this account, the Pheasants on the island called *Isola Madre* in the *Lago Maggiore* at Turin, as they cannot fly over the lake, are imprisoned. When they attempt to cross, they are almost always drowned.

The Pheasant is, in some respects, a stupid bird. On being roused it will often perch on a neighbouring tree ; where its attention will be so fixed on the dogs, that the sportsman can without difficulty approach within gun-shot. It has been asserted that the Pheasant imagines itself out of danger whenever its head only is concealed. Sportsmen, however, who recount the stratagems that they have known old cock Pheasants to adopt, in thick and extensive coverts, before they could be compelled to take wing, convince us that this bird

is by no means deficient in the contrivances that are necessary for its own preservation.

At the commencement of cold weather, Pheasants fly after sun-set into the branches of the oak-trees, and there roost during the night. This they do more frequently as the winter advances, and the trees lose their foliage. The male birds, at these times, make a noise, which they repeat three or four times successively, called by sportsmen *cockeling*. The hens, on flying up, utter one *shrill whistle*, and then are silent. Poachers avail themselves of these notes, to discover the roosting places; and there (in woods that are not well watched) they shoot them with the greatest certainty. Where woods are watched, the poacher, by means of phosphorus, lights several brimstone matches; and the moment the sulphureous fumes reach the birds, they drop to the ground. Or he fastens a snare of wire to the end of a long pole; and, by means of this, drags them, one by one, from the trees. He sometimes catches these birds in nooses made of wire, or twisted horsehair, or even with a brier set in the form of a noose, at the verge of a wood. The birds entangle themselves in these, as they run into the adjacent fields to feed. Foxes destroy great numbers of Pheasants.

The males begin to *crow* during the first week in March; and the noise can be heard at a considerable distance. They occasionally come into farm-yards in the vicinity of coverts where they abound, and sometimes produce a cross breed with the common fowls.

It has been contended that Pheasants are so shy, as not to be tamed without great difficulty. Where, however, their natural fear of man has been counteracted, from their having been bred under his protection; and where he has almost constantly appeared before their eyes in their coverts, they will come to feed immediately on hearing the keeper's whistle. They will follow the keeper in flocks; and scarcely allow the peas to run from his bag into troughs placed for the purpose, before they begin to eat. Those that cannot find room at

one trough, follow him with the same familiarity to others.

Pheasants are found in most parts of England, but are by no means plentiful in the north; and they are seldom seen in Scotland. Wood and corn lands seem necessary to their existence. Were it not for the exertions of gentlemen of property, in preserving these birds in their woods from the attacks of poachers and sportsmen, the breed, in a few years, would be extinct. The demand for Pheasants at the tables of the luxurious, and the easy mark they offer to the sportsman, particularly since the art of *shooting flying* has been generally practised, would soon complete their destruction. Mr. Stackhouse, of Pendarvis in Cornwall, informed me, that forty years ago, he recollects hearing old people say, that in their youth, and in the generation before them, Pheasants were very plentiful in that county; but the race is now extinct.

The general weight of male Pheasants is from two pounds and a half, to three pounds and a quarter. That of the hens is usually about ten ounces less.

The female birds have sometimes been known to assume the plumage of the male. But with Pheasants in a state of confinement, those that take this new plumage always become barren, and are spurned and buffeted by the rest. From what took place in a hen Pheasant, belonging to a lady, a friend of Sir Joseph Banks, it would seem probable that this change arises from some alteration of temperament at a late period of the animal's life. This lady had paid particular attention to the breeding of Pheasants. One of the hens, after having produced several broods, moulted, and the succeeding feathers were exactly like those of a cock. This animal, however, never afterwards had young-ones.

THE CHINESE PHEASANT*, AND ARGUS PHEASANT†.

The singular beauty of the Chinese Pheasants has long rendered these birds objects of admiration. Though inhabitants of the warmer districts of China, they can, without difficulty, be kept in aviaries in our own country. The females are smaller than the males, have a shorter tail, and plumage of much less brilliant colour. In many instances, however, when old, they have been known, like the pea-hen, and the female European Pheasant, to assume a plumage similar to that of the male.

The eggs of the Chinese Pheasant resemble those of the Guinea-fowl; and are in proportion smaller than those of the poultry-hens.

Sir Hans Sloane kept a male Chinese Pheasant nearly fifteen years, during the whole of which time it continued in perfect health. From this bird he obtained a mixed breed with the Common Pheasant. Of this breed the produce had a plumage much less beautiful than that of the Chinese species.

Chinese Pheasants suffer more inconvenience in European climates, from the humidity and changeable

* See Plate xv. Fig. 4.

DESCRIPTION. This bird is distinguished by having a yellow crest, the breast scarlet, the back and rump yellow, the upper tail-coverts long, narrow, and red, the wing-coverts varied with bay and brown, the quill-feathers brown, with yellowish spots; and the secondary quill-feathers blue.

SYNONYMS. *Phasianus pictus*. *Linnaeus*.—Le Faisan Doré. *Buff.*—Painted Pheasant.

† See Plate xv. Fig. 5.

DESCRIPTION. The Argus Pheasant is of a clayey-yellow colour, spotted with black. The face is red, and behind the head is a blue crest. The wings are grey, and have a great number of eye-like spots. The two middle feathers of the tail are very long, and are spotted through their whole length.

SYNONYMS. *Phasianus argus*. *Linnaeus*.—L'Argus ou Le Luen. *Buff.*

THE DOMESTIC COCK.

state of the atmosphere, than from the cold weather of winter. They require more care than Common Pheasants, but are fed and attended in the same manner.

The *Argus Pheasant*, has been so called from the number of eye-like spots with which its wing-feathers are covered. These birds are found in many of the northern parts of China, and in several of the interior districts of India and Sumatra. They are nearly as large as peacocks, and rank among the most beautiful of the feathered creation. They are extremely wild, and very difficult to be kept alive for any length of time after they have been taken from the woods. In a strong light they appear dazzled, and when exposed to such they seem melancholy and inanimate; but in the dark they recover all their animation.

These birds have a cry not much unlike that of a peacock. Their flesh is palatable, and in flavour like that of the Common Pheasant. The wing and tail-feathers are in considerable request as ornaments in female head-dresses.

THE DOMESTIC COCK *.

This bird differs very much from the wild descendants of its primitive stock; which are said to inhabit the forests of India, and most of the islands of the Indian seas.

His beautiful plumage and undaunted spirit, as well as his great utility, have rendered him a favourite in all countries where he has been introduced. His courage is scarcely to be subdued by the most powerful assailants: and though he should die in the effort, he will defend his females against enemies that are infinitely stronger than himself.

“I have just witnessed (says M. de Buffon) a cu-

* SYNONYMS. Phasianus Gallus. *Linnaeus*.—Coq commun. *Buff.*—*Bewick's Birds*, p. 276.

rious scene. A sparrow-hawk alighted in a populous court-yard: a young Cock of this year's hatching instantly darted at him, and threw him on his back. In this situation the hawk defended himself with his talons and his bill, intimidating the hens and turkeys, which screamed tumultuously round him. After he had a little recovered himself, he rose and was taking wing; when the Cock rushed upon him a second time, overturned him, and held him down so long, that he was caught."

The Cock is very attentive to his females, hardly ever losing sight of them. He leads, defends, and cherishes them; collects them together when they straggle; and seems to eat unwillingly till he sees them feeding around him. Whenever any strange Cock appears within his domain, he immediately attacks the intruder, and if possible drives him away.

His jealousy does not, however, seem to be altogether confined to his rivals. It has sometimes been observed to extend even to his beloved female; and he appears capable of being actuated by revenge, founded on suspicions of her conjugal infidelity. Dr. Percival, in his Dissertations, relates an incident that happened at the seat of a gentleman near Berwick, which justifies this remark. "My mowers," says this gentleman, "cut a partridge on her nest; and immediately brought the eggs (fourteen in number) to the house. I ordered them to be put under a very large and beautiful hen, and her own to be taken away. They were hatched in two days, and the hen brought them up perfectly well till they were five or six weeks old. During that time they were constantly kept in an out-house, without being seen by any of the other poultry. The door happening to be left open, the Cock got in. My housekeeper, hearing the hen in distress, ran to her assistance; but did not arrive in time to save her life. The Cock, observing her with the brood of partridges, had fallen upon her with the utmost fury, and killed her. The housekeeper found him tearing the hen with both his

beak and spurs; although she was then fluttering in the last agony, and incapable of any resistance. 'This hen had formerly been the Cock's greatest favourite.'

The patience and perseverance of the hen in hatching, are truly extraordinary. She covers her eggs with her wings, fostering them with a genial warmth; and often turns them, and changes their situations, that all their parts may receive an equal degree of heat. She seems to perceive the importance of her employment; and is so intent on her occupation, as to neglect in some measure even the necessary supplies of food and drink. In about three weeks the young brood burst from their confinement; and the hen, from the most cowardly and voracious, becomes (in the protection of her young) the most daring and abstemious of all birds. If she cast her eyes on a grain of corn, a crumb of bread, or any aliment, though ever so inconsiderable, that is capable of division, she will not touch the least portion of it; but gives her numerous train immediate notice of her success, by a peculiar call, which they all understand. They flock in an instant round her, and the whole treasure is appropriated to them. Though by nature timid, and apt to fly from the smallest assailant; yet, when marching at the head of her brood, she is a heroine, she is fearless of danger, and will fly in the face of the fiercest animal that offers to annoy her.

As the chickens reared by the hen bear no proportion to the number of eggs she produces, many artificial schemes of rearing them have been attempted. The most successful, though by no means the most humane, is said to be where a capon is made to supply the place of a hen. He is rendered very tame; the feathers are plucked from his breast, and the bare parts are rubbed with nettles. The chickens are then put to him; and, by their running under his breast with their soft and downy bodies, his pain is so much allayed, and he feels so much comfort to his featherless body, that he soon adopts them, feeding them like a hen, and assiduously performing all the functions of the tenderest parent.

Chickens have long been hatched in Egypt by means of *artificial heat*. This is now chiefly practised by the inhabitants of a village called Berme, and by those who live at a little distance from it. Towards the beginning of autumn, these persons spread themselves over the country; and each of them is ready to undertake the management of an oven. The ovens are of different sizes, each capable of containing from forty to eighty thousand eggs; and the number of ovens in different parts is about three hundred and eighty-six. They are usually kept in exercise for about six months; and, as each brood occupies twenty-one days in hatching, it is easy, in every oven, to produce eight different broods of chickens in the year.

The ovens where these eggs are placed, are of the most simple construction; consisting only of low arched apartments of clay. Two rows of shelves are formed, and the eggs are placed on these in such a manner as not to touch each other. They are slightly moved five or six times in every twenty-four hours. All possible care is taken to diffuse the heat equally throughout; and there is but one aperture, just large enough to admit a man stooping. During the first eight days the heat is rendered great; but during the last eight it is gradually diminished, till at length, when the young brood are ready to come forth, it is reduced almost to the state of the natural atmosphere. By the end of the first eight days it is known which of the eggs will be productive. Every person who undertakes the care of an oven, is under the obligation only of delivering to his employer two-thirds of as many chickens as there have been eggs given to him; and he is a considerable gainer by this bargain, as it almost always happens that many more than that proportion of the eggs produce chickens.

This useful and advantageous mode of hatching eggs, was introduced into France by M. de Reaumur; who, by a number of experiments, reduced the art to certain principles. He found that the degree of heat necessary for producing all kinds of domestic fowls was the same;

the only difference consisting in the time during which it ought to be communicated to the eggs: it will bring the canary-bird to perfection in eleven or twelve days, while the turkey-poult requires twenty or twenty-eight. M. de Reaumur found that stoves heated by pipes from a baker's oven, or the furnaces of glasshouses, succeeded better than those made hot by layers of dung, the mode preferred in Egypt. These should have their heat kept as nearly equal as possible; and the eggs should be frequently removed from the sides into the middle, in order that each may receive an equal portion. After the eggs are hatched, the offspring should be put into a kind of low boxes without bottoms, and lined with fur; the warmth of which supplies the place of a hen, and in which the chickens can at any time take shelter. These should be kept in a warm room till the chickens acquire some strength; the chickens then may, with safety, be exposed to the open air, in a court-yard.

As to the mode in which the young brood are fed: a whole day generally elapses after they are hatched, before they take any food at all: a few crumbs of bread are given for the subsequent day or two, after which time they begin to pick up insects and grain for themselves. But in order to save the trouble of attending them, capons may be taught to watch them in the same manner as hens. M. de Reaumur says, that he has seen more than two hundred chickens at once, all led about and defended by only three or four capons. It is asserted, that even cocks may be taught to perform this office.

The progress of the incubation of the chicken in the natural way, is a subject too curious, and too interesting, to be passed over without notice. The hen has scarcely sat on the egg twelve hours, before some lineaments of the head and body of the chicken appear. The heart may be seen to beat at the end of the second day: it has at that time somewhat the form of a horse-shoe, but no blood yet appears. At the end of two days, two vesicles of blood are to be distinguished, the pulsation

of which is very visible: one of these is the left ventricle, and the other the root of the great artery. At the fiftieth hour, one auricle of the heart appears, resembling a noose folded down upon itself. The beating of the heart is first observed in the auricle, and afterwards in the ventricle. At the end of seventy hours, the wings are distinguishable; and on the head two bubbles are seen for the brain, one for the bill, and two others for the fore and hind part of the head. Towards the end of the fourth day, the two auricles, already visible, draw nearer to the heart than before. The liver appears towards the fifth day. At the end of a hundred and thirty-one hours, the first voluntary motion is observed. At the end of seven hours more, the lungs and stomach become visible; and four hours after this, the intestines, the loins, and the upper jaw. At the hundred and forty-fourth hour, two ventricles are visible, and two drops of blood instead of the single one which was seen before. On the seventh day, the brain begins to have some consistence. At the hundred and ninetieth hour of incubation, the bill opens, and the flesh appears in the breast; in four hours more, the breast-bone is seen; and in six hours after this, the ribs appear to be forming from the back, and the bill is very visible, as well as the gall-bladder. The bill becomes green at the end of two hundred and thirty-six hours; and if the chicken be taken out of its coverings, it evidently moves itself. The feathers begin to shoot out towards the two hundred and fortieth hour, and the skull becomes gristly. At the two hundred and sixty-fourth hour, the eyes appear. At the two hundred and eighty-eighth, the ribs are perfect. At the three hundred and thirty-first, the spleen draws near the stomach, and the lungs to the chest. At the end of three hundred and fifty-five hours, the bill frequently opens and shuts; and at the end of the eighteenth day, the first cry of the chicken is heard. It afterwards gets more strength, and grows continually, till at length it is enabled to set itself free from its confinement.

In the whole of this process, we must remark that every part appears exactly at its proper time: if, for example, the liver is formed on the fifth day, it is founded on the preceding situation of the chicken, and on the changes that were to follow. No part of the body could possibly appear either sooner or later, without the whole embryo suffering; and each of the limbs becomes visible at the fit moment. This ordination, so wise and so invariable, is manifestly the work of a Supreme Being: but we must still more sensibly acknowledge his creative powers, when we consider the manner in which the chicken is formed out of the parts which compose the egg. How astonishing must it appear to an observing mind, that in this substance there should be, at all, the vital principle of an animated being! That all the parts of an animal's body should be concealed in it, and require nothing but heat to unfold and quicken them! That the whole formation of the chicken should be so constant and regular! That, exactly at the same time, the same changes should take place in the generality of eggs! That the chicken, the moment it is hatched, should be heavier than the egg was before! But even these are not all the wonders in the formation of a bird from the egg: (for this instance will serve to illustrate the whole of the feathered tribes:) there are others, altogether hidden from our observation; and of which, from our very limited faculties, we must ever remain ignorant.

I cannot take leave of this animal, without a few observations on the savage diversion of cock-fighting; which (to the disgrace of a Christian nation) is encouraged, not merely by the lowest and meanest, but by some persons even in the highest ranks of society. The Shrove-Tuesday massacre of throwing at these unfortunate animals is, indeed, almost discontinued; but the cock-pit yet remains a reproach to the character of Englishmen. The refinements which in this country have taken place in the pitting of these courageous birds against each other, would strike almost the rudest of

the savage tribes of mankind with horror. The Battle-royal and the Welsh-main would scarcely be tolerated by any other nation of the world. In the former an unlimited number of Cocks are pitted, of which only the last surviving bird is accounted the victor. Thus, suppose there was at first sixteen pair of Cocks: of these, sixteen are killed; the remaining sixteen are pitted a second time; the eight conquerors of these are pitted a third time; the four conquerors a fourth time; and lastly, the two conquerors of these the fifth time: so that (incredible barbarity!) thirty-one Cocks must be inhumanly murdered in a single battle.

Are these your sovereign joys, Creation's lords?
Is death a banquet for a godlike soul?

The greatest rivals of the English in the practice of cock-fighting, are the inhabitants of Sumatra and some other parts of the East. They indeed pay, perhaps, a greater attention to the training and feeding of the birds than we ever did. They arm one of the legs only, not with a slender gaff as we do, but with a little implement in the form of a scymeter, with which the animals make the most terrible destruction. The Sumatrians fight their cocks for vast sums: a man has been known to stake his wife or children, and a son his mother or sisters, on the issue of a battle. In disputed points, four arbitrators are appointed; and if they cannot agree, there is no appeal but to the sword. Some of these people have a notion that their Cocks are invulnerable: a father on his death-bed has, under this persuasion, been known to direct his son to lay his whole property on a certain bird, fully persuaded of consequent success.

OF THE PINTADO TRIBE*.

The four species of Pintado hitherto known are all

* The bill is strong and short, and the base is covered with

natives of Africa, and of islands adjacent to the African coast. Their mode of feeding is similar to that of the domestic poultry: they scrape the ground with their feet, in search of insects, worms, and seeds.

THE COMMON GUINEA-FOWL*.

In a wild state it is asserted that these birds associate in numerous flocks. Dampier speaks of having seen betwixt two and three hundred of them together, in the Cape de Verd Islands. They were originally introduced into our country from the coast of Africa, somewhat earlier than the year 1260.

They are now sufficiently common in the poultry-yards of Great Britain; but, from the young-ones being difficult to rear, they are not bred in numbers at all equal to those of the domestic poultry. The females lay and hatch their eggs nearly in the same manner as the common hens. The eggs, however, are smaller than those of the hen, and have a harder shell. M. de Buffon states that there is a remarkable difference betwixt the eggs of the domestic Guinea-fowls, and of those which are wild; the latter being marked with small, round spots, like those on the plumage of the birds; and the former being, when first laid, of a tolerably bright red, and afterwards of the faint colour of a dried rose. The young birds, for some time after they come into the world, are destitute of the helmet, or callous protuberance which is so conspicuous on the heads of the old ones.

The voice of the Guinea-fowl is harsh, and, to some

a warty or carunculated cere, which receives the nostrils: on the head there is a horny or callous protuberance. The tail-feathers are short, and bend downward. The feathers of the body are speckled.

+ SYNONYMS. *Numidia meleagris*. Linn.—La Pintade. Buffon.—Guinea Pintado. Willughby.—Pintado, Pearled Hen, and Gallina, in various parts of England.—Bew. *Birds*, i. 305.

persons, unpleasant. It consists chiefly of two notes, *ca-mac, ca-mac, ca-mac*, frequently repeated. The Guinea-fowl is a restless and clamorous bird. During the night it perches on high places; and, if disturbed, alarms every animal within hearing, by its unceasing cry. These birds delight in rolling themselves in the dust, for the purpose, as some naturalists have conjectured, of ridding themselves of insects.

If trained when young, Guinea-fowls may soon be rendered tame. M. Bruë informs us, that when he was on the coast of Senegal, he received as a present from an African princess, two Guinea-fowls. Both these birds were so familiar, that they would approach the table and eat out of his plate; and, when they had liberty to fly about upon the beach, they always returned to the ship, when the dinner or supper bell rang.

It is even said that the wild birds will sometimes receive food from the hand, almost immediately after they are caught. These delight chiefly in marshy and morassy places, where they subsist almost wholly on insects, worms, and seeds. Guinea-fowls are found in nearly all the countries of the western part of Africa, from Barbary, southward, to the Cape of Good Hope. They are natives likewise of the Islands of France and Bourbon, of Madagascar and Cape de Verd.

Amongst the Romans they were in great repute for the table; and, on account of their scarcity, were generally sold for high prices. They are at present much esteemed in this country, their flavour being considered, by some persons, to resemble that of the pheasant. The eggs are a very delicate food.

F THE GROUS IN GENERAL.*

The birds of this tribe which are known in Great

* The Grouse have strong, convex bills; and some of the

Britain, are the different species of Grouse, Partridges, and Quails. Of these, the Grouse are inhabitants chiefly of bleak and mountainous tracts of country. To defend them from the effects of cold, their legs are feathered down to the toes. The nostrils are small, and are hidden under the feathers. Their legs are stout, and the tail generally long. Partridges and Quails inhabit the warmer and more cultivated parts of the country. Their tail is short, and their nostrils are covered with a hard prominent margin.

THE RUFFED GROUSE*.

The Ruffed Grouse has hitherto been found only on the New Continent. He is a fine bird when his gaiety is displayed; that is, when he spreads his tail like that of a turkey-cock, and erects the circle of feathers round his neck like a ruff, walking with a stately and even pace, and making a noise somewhat like that of a turkey. This is the moment which the sportsman seizes to fire at him; for, if the bird observes that he is

species have a naked scarlet skin above each eye. The flesh of all the species is brown, but is excellent food.

* See Plate xv. Fig. 8.

DESCRIPTION. The size of this bird is between that of a pheasant and partridge. The bill is brownish. The head is crested; and, as well as all the upper parts, is variegated with different tints of brown mixed with black. The feathers on the neck are long and loose; and may be erected at pleasure, like those of the cock. The throat and the fore part of the neck are orange brown: and the rest of the under parts are yellowish white, having a few curved marks on the breast and sides. The tail consists of eighteen feathers; all of which are crossed with narrow bars of black, and with one broad band of the same near the end. The legs are covered to the toes (which are flesh-coloured, and pectinated on the sides) with whitish hairs.

SYNONYMS. *Tetrao umbellus.* Linn.—Coq de bruyère à fraise. Buffon.—Ruffed Heathcock. Edwards.

discovered, he immediately flies off to the distance of several hundred yards before he again alights.

There is something very remarkable in what is called the *thumping* of these birds. This they do, as the sportsmen tell us, by clapping their wings against their sides. They stand upon an old fallen tree, and in this station begin their strokes gradually, at about two seconds of time from one another, and repeat them quicker and quicker, until they make a noise not unlike distant thunder. This continues, from the beginning, about a minute; the bird ceases for six or eight minutes, and then begins again. The sound is often heard at the distance of nearly half a mile; and sportsmen take advantage of this note, to discover the birds, and shoot them. The Grouse commonly practise their *thumping* during the spring and fall of the year; at about nine or ten o'clock in the morning, and four or five in the afternoon.

Mr. Brooke, of Maryland in North America, informs us that these birds lay their eggs, from twelve to sixteen in number, in nests which they make either by the side of fallen trees, or the roots of standing ones. This gentleman, when a boy, says that he has found their nests, and has endeavoured to take the old birds, but never could succeed. The sitting bird would let him put his hand almost upon her before she would quit her nest; then by artifice would draw him off from her eggs, by fluttering just before him for a hundred paces or more, so that he has been in constant hopes of taking her. When the nestlings are hatched, and a few days old, they hide themselves so artfully among the leaves, that it is difficult to find them.

THE BLACK GROUS*.

In the northern parts of England these birds were

* DESCRIPTION. The weight of an old black cock is nearly

formerly to be seen in great numbers, but of late years they have become very scarce. This is owing to various causes; but principally to the great improvement in the art of shooting flying, and to the enclosure of waste lands. Some few are yet found in Wales; and in particular parts of the New Forest in Hampshire they are in tolerable plenty, being preserved as royal game, and being always excepted in the warrants to kill game there. They are partial to mountainous and woody situations, far removed from the habitations of men.

Their food is various; but principally consists of the mountain fruits and berries, and, in winter, of the tops of heath. It is somewhat remarkable that cherries and peas are fatal to these birds. They perch and roost in the same manner as the pheasant.

The Black Grouse never pair; but in the spring the males assemble at their accustomed resorts on the tops of heathy mountains, where they *crow* and *clap their wings*. The females, at this signal, resort to them. The males are very quarrelsome, and fight together like game-cocks. On these occasions they are so inattentive to their own safety, that two or three have sometimes been killed at one shot; and instances have occurred of their having been knocked down with a stick.

four pounds; but that of the female is not often more than two. The plumage of the whole body of the male is black, and glossed over the neck and rump with a shining blue. The coverts of the wings are of a dusky brown: the four first quill-feathers are black, the next white at the bottom. The lower half, and the tips, of the secondary feathers, are white. The inner coverts of the wings are white. The tail is much forked: the exterior feathers bend greatly outward, and their ends seem as if cut off. The colours of the female differ considerably from those of the male: the tail also is but slightly forked.

SYNONYMS. *Tetrao tetrix*. *Linnaeus*.—Heath-cock, Black Game, or Grouse. *Willughby*.—Black Cock. *Pennant*.—*Bew. Birds*. vol. i. p. 298.

The female forms an artless nest on the ground; and lays six or eight eggs, of a dull yellowish white colour, marked with numerous very small ferruginous specks, and, towards the smaller end, with some blotches of the same. These are hatched late in the summer. The young males quit the parents in the beginning of winter, and keep together in flocks of seven or eight till the spring.

Black Grouse will live and thrive in menageries, but they have not been known to breed in a state of confinement. In Sweden, however, a spurious breed has sometimes been produced with the domestic hen.

In Russia, Norway, and other extreme northern countries, the Black Grouse are said to retire under the snow during winter. The shooting of them in Russia is thus conducted:—Huts full of loop-holes, like little forts, are built for the purpose, in woods frequented by these birds. Upon the trees within shot of the huts, are placed artificial decoy-birds. As the Grouse assemble, the company fire through the openings; and so long as the sportsmen are concealed, the report of guns does not frighten the birds away. Several of them may therefore be killed from the same tree, when three or four happen to be perched on branches one above another. The sportsman has only to shoot the undermost bird first, and the others upward in succession. The uppermost bird is earnestly employed in looking down after his fallen companions, and keeps chattering to them till he becomes himself a victim.

During winter the inhabitants of Siberia take these birds in the following manner:—A number of poles are laid horizontally on forked sticks, in the open birch forests. Small bundles of corn are tied on these, by way of allurement; and, at a little distance, some tall baskets of conical shape are placed, having their broad part uppermost. Within the mouth of each basket is placed a small wheel; through which passes an axis so nicely fixed, as to admit it to play very readily, and, on the least touch either on one side or the other, to drop.

down, and again recover its situation. The Black Grouse are soon attracted by the corn on the horizontal poles. The first comers alight upon them, and after a short repast fly to the baskets, and attempt to settle on their tops; when the wheel drops sideways, and they fall headlong into the trap. These baskets are sometimes found half-full of birds thus caught.

THE RED GROUS, OR RED GAME*.

The heathy and mountainous parts of the northern counties of England are in general well stocked with Red Grouse. These birds are likewise very common in Wales, and the Highlands of Scotland; but they have not yet been observed in any of the countries of the Continent.

In winter they are usually found in flocks of sometimes forty or fifty in number, which are termed by sportsmen *packs*, and become remarkably shy and wild. They keep near the summits of the heathy hills, and seldom descend to the lower grounds. Here they feed on the mountain-berries, and on the tender tops of the heath.

They pair in spring; and the females lay from six to ten eggs, in a rude nest formed on the ground. The young brood (which during the first year are called *poulls*) follow the hen till the approach of winter; when they unite, with several others, into packs.

Red Grouse have been known to breed in confine-

* **DESCRIPTION.** The weight of the male is about nineteen and of the female fifteen ounces. The bill is black; and at the base of the lower mandible there is on each side a white spot. Each eye is arched with a large, naked, scarlet spot. The throat is red. The plumage of the upper parts of the body is mottled with dusky red and black. The breast and belly are purplish, crossed with small dusky lines.

SYNONYMS. Tetrao Scoticus. Linn. *Gmel.*—Gorcock, or Moorcock. *Willughby.*—Moor-fowl, in Scotland.—*Bew. Birds*, vol. i. p. 301.

ment, in the menagerie of the late Duchess Dowager of Portland. This was in some measure effected by her Grace causing fresh pots of heath to be placed in the menagerie almost every day.

The flesh of the Red Grouse, as in all others of this tribe, is an excellent food, but it soon corrupts. To prevent this, the birds should be drawn immediately after they are shot.

THE PTARMIGAN, OR WHITE GAME

These birds moult in the winter months, changing at this season their summer dress for one more warm; and, instead of having their feathers of many colours, they then become white. By a wonderful provision, every feather also, except those of the wings and tail, becomes double; a downy one shooting out at the base of each, which gives an additional protection against the cold. Towards the end of February a new plumage begins to appear; the first rudiments of the coat which the birds assume in the warm season. In answer to inquiries made on this subject, by Sir Joseph Banks, Dr. Solander, and some other naturalists, of Captain George Cartwright, who resided many years on the coast of Labrador, he says, "I took particular notice of those I killed; and can aver, for a fact, that they get at this time of the year (September) a very large addition of feathers, all of which are white; and that the coloured feathers at the same time change to white. In

* **DESCRIPTION.** The Ptarmigan is somewhat larger than a Pigeon. Its bill is black; and its plumage, in summer, is of a pale brown colour, elegantly mottled with small bars and dusky spots. The head and neck are marked with broad bars of black, rust-colour, and white. The wings and belly are white.

SYNONYMS. *Tetrao lagopus.* Linn.—Lagopede. Buff.—Snicariper. Schaffer.—Snoripa, in Lapland. Conset.—Willow Partridge, about Hudson's Bay.—Bew. Birds, p. 303.—Penn. Brit. Zool. vol. i. tab. 43.

spring, most of the white feathers drop off, and are succeeded by coloured ones; or, I rather believe, all the white ones drop off, and they get an entirely new set. At the two seasons they change very differently: in the spring beginning at the neck, and spreading from thence; now the change begins on the belly, and ends at the neck.

Their feet, by being feathered entirely to the toes, are well protected from the cold. Every morning the birds take a flight directly upward into the air, apparently to shake the snow from their wings and bodies. They feed in the mornings and evenings, and in the middle of the day they bask in the sun.

About the beginning of October the Ptarmigans assemble in flocks of a hundred and fifty or two hundred, and live much among the willows, the tops of which they eat. In December they retire from the flats about Hudson's Bay to the mountains, to feed on the mountain berries. Some of the Greenlanders believe that Ptarmigans, in order to provide a subsistence through the winter, collect a store of mountain berries into some crevice of a rock near their retreat; and it is generally supposed, that, by means of their long, broad, and hollow nails, they form lodges under the snow, where they lie in heaps to protect themselves from the cold. During winter they are often seen flying in great numbers among the rocks.

Though sometimes found in the mountains of the north of Scotland, the Ptarmigans are chiefly inhabitants of that part of the globe which lies about the Arctic Circle. Their food consists of the buds of trees, young shoots of pine and heath, and of fruits and berries which grow on the mountains. They are so stupid and silly, as often to suffer themselves, without the least difficulty, to be knocked on the head, or to be driven into any snare that is set for them. They frequently stretch out their neck, apparently in curiosity, and remain otherwise unconcerned, while the fowler takes aim at them. When frightened,

they fly off; but immediately afterwards they alight, and stand staring at their foe. If the hen bird be killed, it is said that the male will not forsake her, but may then also be killed. So little alarmed are these birds at the presence of mankind, as even to bear driving like poultry: yet, notwithstanding this apparent gentleness of disposition, it is impossible to domesticate them; for when caught they refuse to eat, and they always die soon afterwards.

Their voice is very extraordinary: and they do not often exert it except in the night. Ptarmigans are seldom found in Sweden; and one of these birds, several years ago, happening to stray within a hundred miles of Stockholm, very much alarmed the common people of the neighbourhood; for, from its nightly noise, a report was circulated that the wood, where it had taken up its residence, was haunted by a ghost. So much were the people terrified by this supposed sprite, that, for a considerable time, nothing could tempt the post-boys to pass the wood after dark. The spirit, however, was at last removed, by a gamekeeper shooting the bird.

Ptarmigans form their nests on the ground, in dry ridges; and lay from six to ten dusky eggs with reddish-brown spots.

The usual method of catching these birds is by nets made of twine, twenty feet square, connected to four poles, and propped with sticks in front. A long line is fastened to these, the end of which is held by a person who lies concealed at a distance. Several people drive the birds within reach of the net; which is then pulled down, and is often found to cover fifty or sixty of them. Ptarmigans are in such plenty in the northern parts of America, that upwards of ten thousand are frequently caught for the use of the Hudson's Bay Settlement, between November and May.

The Laplanders catch these birds by means of a hedge formed with the branches of birch-trees, and having small openings, at certain intervals, with a snare in each. The birds are tempted to feed on the buds

and catkins of the birch; and whenever they endeavour to pass through the openings, they are instantly caught.

They are excellent food; and in taste are so like the common grouse, as to be scarcely distinguishable from it.

THE PARTRIDGE

The extremes of heat and cold are alike unfavourable to the propagation of the Partridge. This bird also flourishes best in cultivated countries, living principally on the labours of the husbandman. In Sweden Partridges burrow beneath the snow; and the whole covey crowd together under this shelter, to guard against the intense cold. In Greenland, the Partridge is brown during summer; but, as soon as the winter sets in, it becomes clothed with a thick and warm down, and its exterior feathers assume the colour of the snow.

Partridges have ever held a distinguished place at the tables of the luxurious, both in this country and in France. We have an old distich:

If the Partridge had the Woodcock's thigh,
'Twould be the best bird that e'er did fly.

They pair about the third week in February; and sometimes, after pairing, if the weather be very severe, they collect together, and again form into coveys. The female lays her eggs, usually from fifteen to eighteen in number, in a rude nest of dry leaves and grass, formed upon the ground: these are of a greenish-gray colour. The period of incubation is three weeks. So closely do these birds sit on their eggs when near hatching, that a Partridge with her nest has been carried in a hat to some distance, and in confinement has continued her in-

* **SYNONYMS.** Tetrao Perdrix. *Linnaeus*.—Perdrix grise. *Buffon*.—*Bew. Birds.* p. 305.

cubation, and there produced young-ones*. The great hatch is about the first ten days in June; and the earliest birds begin to fly towards the latter end of that month. The young brood are able to run about as soon as they are hatched, and they are even sometimes seen encumbered with a piece of the shell sticking to them. The parents immediately lead them to ant-hills, on the grubs of which insects they at first principally feed.

At the season when the Partridge is produced, the various species of ants loosen the earth about their habitations. The young birds, therefore, have only to scrape away the earth, and they can satisfy their hunger without difficulty. A covey that some years ago excited the attention of the Rev. Mr. Gould, gave him an opportunity of remarking the great delight which they take in this kind of food. On his turning up a colony of ants, and withdrawing to some distance, the parent birds conducted their young-ones to the hill, and fed very heartily. After a few days they grew more bold, and ventured to eat within twelve or fourteen yards of him. The surrounding grass was high; by which means they could, on the least disturbance, immediately run out of sight and conceal themselves. This is an excellent food for Partridges that are bred up under a domestic hen: if constantly supplied with ants' grubs and fresh water, the birds seldom fail to arrive at maturity. Along with the grubs it is recommended to give them, at intervals, a mixture of millepedes; or wood-lice, and earwigs: fresh curds mixed with lettuce, chickweed, or groundsel, should also be given them.

The affection of Partridges for their offspring is peculiarly interesting. Both the parents lead them out to feed; they point out to them the proper places for their food, and assist them in finding it by scratching the ground with their feet. They frequently sit close together, covering the young-ones with their wings; and

* This circumstance was related to Mr. Montagu, by a gentleman of undoubted veracity. See *Montagu, an. Partridge*.

from this protection they are not easily roused. If, however, they are disturbed, most persons acquainted with rural affairs know the confusion that ensues. The male gives the first signal of alarm, by a peculiar cry of distress; throwing himself at the same moment more immediately into the way of danger, in order to mislead the enemy. He flutters along the ground, hanging his wings, and exhibiting every symptom of debility. By this stratagem he seldom fails of so far attracting the attention of the intruder, as to allow the female to conduct the helpless, unfledged brood into some place of security. "A Partridge (says Mr. White, who gives an instance of this instinctive sagacity) came out of a ditch, and ran along shivering with her wings, and crying out as if wounded and unable to get from us. While the dam feigned this distress, a boy who attended me saw the brood, which was small and unable to fly, run for shelter into an old fox-hole, under the bank." Mr. Markwick relates, that "once as he was hunting with a young pointer, the dog ran on a brood of very small Partridges. The old bird cried, fluttered, and ran tumbling along just before the dog's nose, till she had drawn him to a considerable distance; when she took wing and flew further off, but not out of the field. On this the dog returned nearly to the place where the young-ones lay concealed in the grass; this the old bird no sooner perceived than she flew back again, settled just before the dog's nose, and a second time acted the same part, rolling and tumbling about till she drew off his attention from her brood, and thus succeeded in preserving them." This gentleman says also, that, when a kite was once hovering over a covey of young Partridges, he saw the old birds fly up at the ferocious enemy, screaming and fighting with all their might to preserve their brood.

The eggs of the Partridge are frequently destroyed by weasels, stoats, crows, magpies, and other animals. When this has been the case, the female frequently makes another nest and lays afresh. The produce of these second hatchings are those small birds that are

not perfectly feathered in the tail till the beginning of October. This is always a puny, sickly race; and the individuals seldom outlive the rigours of the winter.

It is said that those Partridges which are hatched under a domestic hen, retain through life the habit of *calling* whenever they hear the clucking of hens.

The Partridge, even when reared by the hand, soon neglects those who have the care of it; and, shortly after its full growth, altogether estranges itself from the house where it was bred. This will almost invariably be its conduct, however intimately it may have connected itself with the place and inhabitants in the early part of its existence. Among the few instances of the Partridge's remaining tame, was that of one reared by the Rev. Mr. Bird. This, long after its full growth, attended the parlour at breakfast and other times, received food from any hand that gave it, stretched itself before the fire, and seemed much to enjoy the warmth. At length, it fell a victim to that foe of all favourite birds, a cat.

On the farm of Lion Hall, in Essex, belonging to Colonel Hawker, a Partridge, in the year 1788, formed her nest, and hatched sixteen eggs, *on the top of a pollard oak-tree*. What renders this circumstance the more remarkable is, that the tree had, fastened to it, the bars of a stile, where there was a footpath; and the passengers, in going over, discovered and disturbed her before she sat close. When the brood was hatched, the birds scrambled down the short and rough boughs, which grew out all around from the trunk of the tree, and reached the ground in safety.

In the year 1798, the following occurrence took place at East Dean in Sussex; which will tend to prove that Partridges have no powers of migration. A covey of sixteen Partridges, having been disturbed by some men at plough, directed their flight across the cliff to the sea, over which they continued their course about three hundred yards. Either intimidated or otherwise affected by that element, the whole were then observed

to drop into the water. Twelve of them were soon afterwards floated to shore by the tide: where they were picked up by a boy, who carried them to Eastbourn for sale.

It has long been a received opinion among sportsmen, as well as among naturalists, that the female Partridge has none of the bay feathers of the breast like the male. This, however, on dissection, has proved to be a mistake; for Mr. Montagu happening to kill nine birds in one day, with very little variation as to the bay mark on the breast, he was led to open them all, and discovered that five of them were females. On carefully examining the plumage, he found that the males could only be known by the superior brightness of colour about the head; which alone, after the first or second year, seems to be the true mark of distinction.

THE QUAIL*.

The Quail is an inhabitant of nearly all countries, and in all it is esteemed excellent food. In appearance it is so like the partridge, that it is sometimes called *Dwarf Partridge*; and, in the manners of the two spe-

* **DESCRIPTION.** The bill of this bird is of a dusky colour. The feathers of the head are black, edged with rusty brown. The crown of the head is divided by a whitish yellow line, beginning at the bill, and running along the hind part of the neck to the back. Above each eye there is another line of similar colour. The chin and throat are of a dirty white. The cheeks are spotted with brown and white. The breast is of a pale yellowish red, spotted with black. The scapular feathers, and those on the back, are marked in the middle with a long, pale, yellow line; and on their sides with ferruginous and black bars. The coverts of the wings are reddish brown, elegantly barred with paler lines, bounded on each side with black. The exterior side of the first quill-feathers is white; and of the others, dusky spotted with red. The tail consists of twelve short feathers, barred with black and very pale brownish red. The legs are of a pale hue. *Pennant.*

SYNONYMS. Tetrao Coturnix. *Linnaeus.*—Le Caille. *Buff.*—*Bew Birds* i. p. 308.

cies, there is a great resemblance. They feed, form their nest, and rear their young ones, nearly in the same way. They are, however, in many respects very different. Quails migrate : they are always smaller ; and have not a naked space between the eyes, nor the figure of a horse-shoe on their breasts. The eggs too are less than those of the partridge, and very different in colour. Their voices are unlike. Quails seldom live in coveys ; except when their wants unite the feeble family to their mother, or some powerful cause urges great numbers to assemble, and traverse together the extent of the ocean, holding their course to the same distant lands. They are much less cunning than the partridge ; and more easily ensnared, especially when young.

The females lay about ten eggs, in the incubation of which they are occupied three weeks. The eggs are whitish ; but marked with ragged rust-coloured spots. Quails have been supposed, but without foundation, to breed twice in the year.

These birds usually sleep during the day, concealed in the tallest grass ; lying on their sides, with their legs extended. So very indolent are these birds, that a dog must absolutely run upon them before they are flushed ; and when they are forced upon wing, they seldom fly far. Quails are easily drawn within reach of a net, by a call imitating their cry, which is not unlike the words *whit, whit, whit* : this is done with an instrument called a quail-pipe.

Quails are found in several parts of Great Britain ; and the time of their migration from this country is August or September. They are supposed to winter in Africa ; and they return early in the spring. At their arrival in Alexandria, such multitudes are exposed in the markets for sale, that three or four may sometimes be bought for a medina (a coin less than three farthings in value.) Crews of merchant-vessels have been fed upon them ; and complaints have sometimes been laid at the consul's office, by mariners against their captains, for giving them nothing but Quails to eat.

With wind and weather in their favour, these birds have been known, in the course of one night, to perform a flight of fifty leagues across the Black Sea; a wonderful distance for so short-winged a bird.

Such prodigious numbers of Quails have sometimes appeared on the western coasts of the kingdom of Naples, that a hundred thousand have, in one day, been caught within the space of three or four miles. Most of these are taken to Rome; where they are in great request, and are sold at high prices. Clouds of Quails also alight, in spring, along the coasts of Provence: especially in the lands belonging to the bishop of Frejus, which border on the sea. Here they are sometimes found so exhausted, that for a few of the first days they may be caught with the hand. In some parts of the south of Russia they abound so greatly, that at the time of their migration they are caught by thousands, and sent in casks to Moscow and Petersburgh.

With respect to these birds having an instinctive knowledge of the precise time for emigration, we have a singular fact in some young Quails, which having been bred in cages from the earliest period of their lives, had never enjoyed, and therefore could not feel, the loss of liberty. For four successive years they were observed to be restless, and to flutter with unusual agitations, regularly in September and April; and this uneasiness lasted thirty days each time. It began constantly an hour before sun-set. The birds passed the whole night in these fruitless struggles; and always on the following day appeared dejected and stupid.

We import, from France, great numbers of these birds for the table; all of which are males. They are conveyed by stage-coaches, in large square boxes, divided into five or six compartments, one above another, just high enough to admit the Quails to stand upright, and each box containing about a hundred birds. Were they allowed a greater height than this, they would soon kill themselves; and even with this precaution, the feathers on the top of the head are generally beaten off.

The boxes have wire on the fore part, and each partition is furnished with a small trough for food.

Quails are birds of undaunted courage; and their quarrels often terminate in mutual destruction. This irascible disposition induced the ancient Greeks and Romans to fight them with each other, as the moderns do game-cocks. And such favourites were the conquerors, that in one instance Augustus punished a præfect of Egypt with death, for having brought to his table one of these birds which had acquired celebrity for its victories. The fighting of Quails is even now a fashionable diversion in China, and in some parts of Italy.

OF THE BUSTARDS IN GENERAL.

The Bustards have a somewhat convex bill, with open and oblong nostrils. Their legs are long, and naked above the knees. The feet have only three toes, all placed forward.

There are about twelve different species of Bustards, nearly all of which are inhabitants of the Old Continent.

THE GREAT BUSTARD*.

There is one very essential distinction betwixt the male and the female of this species. The former is

See Plate xiii. Fig. 5.

DESCRIPTION. This is the largest land-fowl produced in our island, the male sometimes weighing twenty-five pounds and upwards. The length is nearly four feet, and the breadth nine. The head and neck are ash-coloured. The back is transversely barred with black, and bright rust-colour. The belly is white: and the tail, consisting of twenty feathers, is barred with red and black. The legs are dusky. On each side of the lower mandible of the bill there is a tuft of feathers about nine inches long.

The female is not much more than half the size of the male. The top of her head is of a deep orange, and the rest of the head

furnished with a sac or pouch, situated in the fore part of the neck, and capable of containing more than two quarts of water. The entrance to this pouch is immediately under the tongue. This singular reservoir was first discovered by Dr. Douglas, who supposes that the bird fills it with water, to supply its thirst in the midst of those extensive plains where it is accustomed to wander. The Bustard likewise makes a further use of it, in defending itself against the attacks of birds of prey: on these occasions it throws out the water with such violence, as not unfrequently to baffle the pursuit of its enemy.

This bird makes no nest, but the female lays her eggs in some hollow place of the ground, in a dry corn-field; these are two in number, as big as those of a goose, and of a pale olive brown, marked with spots of a deeper colour. If, during her absence from the nest, any one handle, or even breathe upon the eggs, she immediately abandons them. The young ones follow the dam soon after they are excluded from the egg, but they are not capable for some time of flying.

Bustards feed on green corn, the tops of turnips, and other vegetables, as well as on worms: and they have been known also to eat frogs, mice, and young birds. They are remarkable for their great timidity: they carefully avoid mankind, and are easily driven away in whole herds by the smallest dog.

In England these birds are now and then met with: they frequent the open countries of the south and east parts, from Dorsetshire, as far as the wolds in Yorkshire; and are sometimes, though rarely, seen on Salisbury Plain. They are slow in taking wing, but run

brown. Her colours are not so bright as those of the male, and she wants the tuft on each side of the head.

SYNONYMS. *Otis tarda*. *Linnaeus*.—*Outarde*. *Buff.*—*Bus-tard*. *Willughby*.—*Bew. Birds*, p. 314.—*Penn. Brit. Zool.* i. tab. 44.

with great rapidity,* and the young-ones are sometimes coursed and taken by grey-hounds.

OF THE TRUMPETERS*.

This singular tribe, of which only two species have yet been discovered, stands arranged, even in Gmelin's edition of the *Systema Naturæ*, among the birds of the ensuing order, the *Waders*; but both in its formation and habits it differs so materially from the whole of that order, that I have not hesitated to follow the example of Dr. Latham, in placing it among the gallinaceous birds.

THE GOLD-BREASTED TRUMPETER†.

The most characteristic and remarkable property of the Gold-breasted Trumpeters consists in the singular noise which they often make, either of their own accord, or when urged by their keepers. To induce one of the

* The bill is moderately long, having the upper mandible a little convex. The nostrils are oblong, sunk, and pervious. The tongue is cartilaginous, flat, and fringed at the tip. The legs are naked a little above the knees; and the toes are placed three before and one behind.

* See Plate xv. Fig. 7.

DESCRIPTION. The length of this bird is about twenty-two inches; and its legs are five inches high, and completely covered with small scales, which reach two inches above the knee. Its general plumage is black: and the feathers of the head and neck are very short and downy; those of the fore part of the neck, and upper part of the breast, of a glossy gilded green, with a reflection of blue in some lights. The feathers between the shoulders are rust-coloured, changing into a pale ash-colour as they pass downward. They are loose and silky. Those of the scapulars are long, and hang over the tail, which is very short, and consists of twelve blackish feathers. The legs are greenish; and the bill is yellowish green, having the nostrils pervious.

SYNONYMS. *Psophia crepitans*. Linn.—*Caracara*. Buff.

birds to this, it is sometimes necessary to entice it with a bit of bread to come near; and then, making the same kind of sound, which the keepers can well imitate, the bird will frequently be disposed to repeat it. This equivocal noise, which somewhat resembles the moans of a pigeon, is at times preceded by a savage cry, interrupted by a sound approaching that of *sherck, sherck*. In this way the bird utters five, six, or seven times, with precipitation, a hollow voice emitted from within its body, nearly as if one pronounced *tou, tou, tou, tou, tou, tou*, with the mouth shut, resting upon the last *tou*, . . . a very long time, and terminating by sinking gradually with the same note. It also much resembles the lengthened, doleful noise, which the Dutch bakers make by blowing a glass trumpet, to inform their customers when the bread comes out of the oven. This odd sort of tone is probably owing to the extent of the bird's lungs, and the capacity of the membranaceous cells: and it may probably be communicated through the muscles and teguments of its body. The Gold-breasted Trumpeter, when tamed, distinguishes its master and benefactor with marks of affection.—“Having (says Vosmaër) reared one myself, I had an opportunity of experiencing this. When I opened its cage in the morning, the animal hopped round me, expanding his wings, and *trumpeting*, as if to wish me good morning. He showed equal attention when I went out and returned. No sooner did he perceive me at a distance, than he ran to meet me; and even when I happened to be in a boat, and set my foot on shore, he welcomed me with the same compliments, which he reserved for me alone, and never bestowed upon others.

The Trumpeter is easily tamed, and always becomes attached to its benefactor. When bred up in the house, it loads its master with caresses, and follows his motions; and, if it conceive a dislike to persons on account of their forbidding figure, or of injuries received, it will pursue them sometimes to a considerable distance, biting their legs, and testifying every mark of displea-

pure. It obeys the voice of its master, and even answers to the call of others to whom it bears no ill-will. It is fond of caresses, and offers its head and neck to be stroked; and if once accustomed to these familiarities, it becomes troublesome, and will not be satisfied without continual fondling. It makes its appearance as often as its master sits down to table, and begins by driving out the dogs and cats from the room; for it is so obstinate and bold, that it never yields, but, often after a tough battle, will put even a middle-sized dog to flight. It avoids the bites of its antagonist by rising in the air; and retaliates with violent blows of its bill and claws, aimed chiefly at the eyes. After it gains the superiority, it pursues its victory with the utmost rancour, and, if not taken off, will destroy the fugitive. By its intercourse with man, its instincts become moulded like those of dogs; and we are assured that it can be trained to attend a flock of sheep. It even shows a degree of jealousy of its human rivals; for, when at table, it bites fiercely the naked legs of the negroes and other domestics who approach its master.

Nearly all these birds have a habit of following people through the streets, and out of town; even those whom they have never seen before. It is difficult to get rid of them; if a person enter a house, they will wait his return, and again join him, though after an interval of two or three hours. "I have sometimes, (says M. de la Borde) betaken myself to my heels; but they ran faster, and always got before me; and when I stopped they stopped also. I know one that invariably follows all the strangers who enter its master's house, accompanies them into the garden, takes as many turns there as they do, and attends them back again.

In a state of nature this bird inhabits the arid mountains and upland forests of South America; never visiting the cleared grounds, nor the settlements. It associates in numerous flocks. It walks and runs, rather than flies; for it never rises more than a few feet from the ground, and then only to reach some short distance,

br to gain some low branch. It feeds on wild fruits; and, when surprised in its haunts, makes its escape by the swiftness of its feet, at the same time emitting a shrill cry not unlike that of a turkey.

OF THE OSTRICHES IN GENERAL.

In the Ostriches, the bill is straight and depressed. The wings are small in proportion to the size of the body, and altogether useless for flight. The legs are naked above the knee: the number of the toes, in one species is two, and in the remaining species three; and these are placed forwards.

THE BLACK OR GREAT OSTRICH*.

The sandy and burning deserts of Africa and Asia, are the only native residences of the Black Ostriches. Here these birds are seen in flocks, so extensive as sometimes to have been mistaken for distant cavalry.

There are many circumstances in the economy of the Ostrich, which differs from those of the feathered race in general. This bird seems to form one of the links of union in the great chain of nature, connecting the winged with the four-footed tribes. Its strong-jointed legs, and (if I may venture so to call them) cloven

* See Plate xii. Fig. 4.

DESCRIPTION. This Ostrich stands so high as to measure from seven to nine feet from the top of the head to the ground. From the back, however, it is seldom more than three or four feet, the rest of its height being made up by its extremely long neck. The head is small; and, as well as the greater part of the neck, is covered only with a few scattered hairs. The feathers of the body are black and loose; those of the wings and tail are of a snowy white, waved, and long, having here and there a tip of black. The wings are furnished with spurs. The thighs and flanks are naked; and the feet are strong, and of a gray-brown colour.

SYNONYMS. *Struthio Camelus*, *Linn.*—*Autruche*, *Buff.*

hoofs, are well adapted both for speed and defence. Its wings are insufficient to raise it from the ground : its camel-shaped neck is covered with hair : its voice is a kind of hollow, mournful lowing : and it grazes on the plain with the quagga and the zebra.

Ostriches are frequently injurious to farmers in the interior of Southern Africa, by coming in flocks into their fields, and destroying the ears of wheat so effectually, that in a large tract of land they sometimes leave nothing but the mere straw behind. The body of the bird is not higher than the corn ; and when it devours the ears, it bends down its long neck, so that at a little distance it cannot be seen : but on the least noise it rears its head, and generally contrives to escape before the farmer gets within gun-shot of it.

When the Ostrich runs, it has a proud and haughty appearance ; and, even when in extreme distress, never appears in great haste, especially if the wind be with it. Its wings are frequently of material use in aiding its escape ; for, when the wind blows in the direction that it is pursuing, it always flaps them. In this case the swiftest horse cannot overtake it : but if the weather be hot, and there be no wind, the difficulty of out-running it is not so great.

Ostriches are polygamous birds ; one male being generally seen with two or three, and sometimes with five females. It has been commonly believed, that the female Ostrich, after depositing her eggs in the sand, and there covering them up, trusts them to be hatched by the heat of the climate, and leaves the young-ones to provide for themselves. Even the author of the book of Job alludes to this popular notion respecting the Ostrich, " which leaveth her eggs in the earth, and warmeth them in the dust ; and forgetteth that the foot may crush them, or that the wild beast may break them. She is hardened against her young-ones, as though they were not hers : her labour is in vain, without fear ; because God has deprived her of wisdom, neither hath he imparted to her understanding." Re-

cent travellers have, however, assured us, that no bird has a stronger affection for her offspring than this, and that none watches her eggs with greater assiduity. It happens, probably, in those hot climates, that there is less necessity for the continual incubation of the female; and that she frequently leaves her eggs, which are in no danger of being chilled by the weather. But though she sometimes leaves them by day, she always carefully broods over them by night; and Kolben, who saw great numbers of Ostriches at the Cape of Good Hope, affirms, that they sit on their eggs like other birds, and that the males and females take this office by turns, as he had frequent opportunities of observing. Nor is it more true that they forsake their young-ones as soon as they are excluded from the shell. On the contrary, these are not able to walk for several days after they are hatched. During this time the parents are very assiduous in supplying them with grass and water, and will encounter every danger in their defence. The females which are united to one male, deposit all their eggs in the same place, to the number of ten or twelve each: these they hatch altogether, the male also taking his turn of sitting on them. Between sixty and seventy eggs have sometimes been found in one nest. The time of incubation is six weeks.

M. Le Vaillant informs us, that, in Africa, he started an Ostrich from its nest, where he found eleven eggs quite warm: he also found four others at a little distance. Those in the nest had young-ones in them; but his attendants eagerly caught up the detached ones, assuring him that they were perfectly good to eat. They informed him, that near the nest there are always placed a certain number of eggs, which the birds do not sit upon, and which are designed for the first nourishment of the future young. "Experience, (says M. Le Vaillant) has convinced me of the truth of this observation; for I never afterwards met with an Ostrich's nest, without finding eggs disposed in this manner."

Some time after this, M. Le Vaillant found a female Ostrich on a nest containing thirty-two eggs; and twelve eggs were arranged at a little distance, each in a separate cavity formed for it. He remained near the place some time; and saw three other females come and alternately seat themselves in the nest; each sitting for about a quarter of an hour, and then giving place to another, who, while waiting, sat close by the side of her whom she was to succeed.

That Ostriches have great affection for their offspring, may be inferred from the assertion of Professor Thunberg, that he once rode past the place where a hen Ostrich was sitting on her nest; when the bird sprang up and pursued him, evidently with a view to prevent his noticing her eggs or young. Every time he turned his horse towards her, she retreated ten or twelve paces; but as soon as he rode on again, she pursued him, till he had got to a considerable distance from the place where he had started her.

If the eggs of Ostriches be touched by any person in the absence of the parents, the birds not only desist from laying any more in the same place, but trample to pieces with their feet all those that have been left. The natives of Africa, therefore, are very careful in taking part of the eggs away, not to touch any of them with their hands, but always to push them out of the nest with a long stick.

In the interior of the eggs there are frequently discovered a number of small oval-shaped pebbles, about the size of a marrow-fat pea; of a pale yellow colour, and exceedingly hard. Mr. Barrow states that he saw in one egg nine, and in another twelve. These stones are sometimes set, and used for buttons.

This gentleman, who has favoured the world with an excellent description of the southern country of Africa, states that the eggs of the Ostrich are there considered a great delicacy. They are prepared as food in various ways; but the best way, he says, is to bury them in hot ashes; and, through a hole made in the upper

end, to stir the contents round till they acquire the consistence of an omlet. Prepared in this manner he often found them an excellent repast, in his long journeys over the wilds of Africa. These eggs are easily preserved for a great length of time, even at sea; and without any of that trouble of constantly turning them, which is necessary with hen's eggs. This is owing entirely to the thickness and strength of the shells. At the Cape of Good Hope they are usually sold for about sixpence sterling each. From their large size, one of them is sufficient to serve two or three persons at a meal.

Thunberg saw necklaces and ornaments for the waist, that had been made of the shells of the eggs, by grinding bits of them into the form of small rings.

The Ostrich itself is chiefly valuable for its plumage; and the Arabians have reduced the chase of it to a kind of science. They hunt it on horseback, and begin their pursuit by a gentle gallop; for, should they at the outset use the least rashness, the matchless speed of the game would immediately carry it out of their sight, and in a very short time beyond their reach. But when they proceed gradually, it makes no particular effort to escape. It does not go in a direct line, but runs first to one side and then to the other; this its pursuers take advantage of, and, by rushing directly onward, save much ground. In a few days, at most, the strength of the animal is exhausted; and it then either turns on the hunters and fights with the fury of despair, or hides its head, and tamely receives its fate.

Some persons breed Ostriches in flocks: for they may be tamed with very little trouble; and in their domestic state few animals may be rendered more useful. Besides the valuable feathers which they cast; the eggs which they lay; their skins, which are used by the Arabians as a substitute for leather; and their flesh, which many esteem as excellent food, they are sometimes made to serve the purpose of horses.

In a tame state, it is pleasant to observe with what

dexterity they play and frisk about. In the heat of the day, particularly, they will strut along the sunny side of a house with great majesty, perpetually fanning themselves with their expanded wings, and seeming at every turn to admire, and be enamoured of, their own shadows. During most parts of the day, in hot climates, their wings are in a kind of vibrating or quivering motion, as if designed principally to assuage the heat.

They are tractable and familiar towards persons who are acquainted with them; but they are often fierce towards strangers, whom they sometimes attempt to push down, by running furiously upon them; and, on succeeding in this effort, they not only peck at the fallen foe with their bills, but strike at him violently with their feet. While thus engaged, the Ostriches sometimes make a fierce hissing noise, and have their throats inflated and their mouths open. At other times they make a kind of cackling noise, like some species of poultry: this they use when they have overcome or routed an adversary. During the night they often utter a doleful or hideous cry, somewhat resembling the distant roaring of a lion, or the hoarse tone of a bear or an ox, as if they were in great agony.

They will swallow, with the utmost voracity, rags, leather, wood, iron, or stone, indiscriminately. "I saw one at Oran, (says Dr. Shaw,) that swallowed, without any seeming uneasiness or inconvenience, several leaden bullets, as they were thrown upon the floor, *scorching hot from the mould!*"

When Mr. Adanson was at Podar, a French factory on the southern bank of the river Niger, two young but nearly full-grown Ostriches belonging to the factory, afforded him a very amusing sight. They were so tame, that two little blacks mounted both together on the back of the largest. No sooner did he feel their weight, than he began to run as fast as possible, and carried them several times round the village; as it was impossible to stop him otherwise than by obstruct-

ing the passage. This sight pleased Mr. Adanson so much, that he wished it to be repeated; and, to try their strength, he directed a full-grown negro to mount the smaller, and two others the larger of the birds. This burden did not seem at all disproportioned to their strength. At first they went at a tolerably sharp trot; but when they became heated a little, they expanded their wings, as though to catch the wind, and moved with such fleetness that they scarcely seemed to touch the ground. Most people have seen a partridge run, and consequently they must know that no man is able to keep up with it: and it is easy to imagine, that if the partridge had a longer step, its speed would be considerably augmented. The Ostrich moves like the partridge, with this advantage; and the two birds here spoken of would have distanced the fleetest race-horses that ever were bred. It is true, they would not have held out so long as a horse; but they would undoubtedly have been able to go over a given short space in less time.

THE CASSOWARY*.

Like the ostrich, this bird is not very delicate in its taste. It will swallow almost any thing not too large

* *See Plate xii. Fig. 5.*

DESCRIPTION. The body of the Cassowary is extremely heavy, and its wings are so short, that it has no power to raise itself from the ground in flight. The quills of which the wings are composed, are five in number; they are strong, distant from each other, and without barbs. They are, in short, so many spines; and are given to the animal as weapons of defence against its enemies. The beak is about five inches long, somewhat curved, and of a very hard substance. A bony protuberance, covered with horn, and of a blackish brown colour, forms on the top of the head a sort of helmet. The skin of the head and neck is entirely naked, and is of a fine blue colour above and red below. On each side of the front of the neck, hangs a long light blue caruncle or wattle. The body is covered with black feathers, which at a little distance, have the

to pass down its throat, that is presented to it. Some writers have asserted, that the Cassowary will occasionally swallow even burning coals. It is particularly fond of fruit, and of the eggs of poultry; but it is not able to eat any kind of grain, as the tongue is so formed as to have no power of guiding this down the throat.

A Cassowary now kept in the Menagerie of the museum at Paris, devours every day betwixt three and four pounds weight of bread, six or seven apples, and a bunch of carrots. In summer, it drinks about four pints of water in the day; and in winter somewhat more. It swallows all its food without bruising it. The bird is sometimes ill-tempered and mischievous; is much irritated when any person approaches it of a dirty or ragged appearance, or dressed in red clothes; and frequently attempts to strike at them by kicking forward with its feet. It has been known even to leap out of its enclosure, and to tear the legs of a man with its claws.

The Cassowary is a very vigorous and powerful bird. Its beak being in proportion, much stronger than that of the ostrich, it has the means of defending itself with great advantage, and of easily pulling down and breaking in pieces almost any hard substance. It strikes, in a very dangerous manner with its feet, either behind or before, at any object which offends it.

This bird is supposed to have been unknown in Europe until about the year 1597, when the Dutchmen, on their return from their first voyage to India, brought one of these birds from Java. This was given to them by the reigning prince of that island. During a considerable while it was exhibited in Amsterdam, for mo-

appearance of hair. Those on the hinder part of the back are of such length, as entirely to conceal the tail. The thighs are each about eighteen inches long, and are covered with feathers almost to the knees. The legs are remarkably stout; the toes of each foot are only three in number, and the nail of each internal toe is about twice the length of any of the others.

SYNONYMS. *Struthio cassuarius*. *Lin.*—*Emeu*.

ney : it was then sold to the Count de Salms, who gave it to the Elector of Cologne; and by him it was presented to the Emperor of Germany. In the course of the ensuing six years, the Dutch merchants shipped two others from the same place, but both of these died during the voyage. In the year 1671, a Cassowary was sent by the governor of Madagascar to the king of France, which was kept alive for four years, in the royal Menagerie at Versailles. Since this period, Cassowaries have frequently been brought into Europe, and as they bear the climate of Europe much better than most animals imported from the torrid regions, there are few countries in this part of the world entirely without them.

There was, not long ago, a Cassowary in the Menagerie at Exeter 'Change. This bird was every day driven many times out of its cage by the keeper, in order to be exhibited to the visitors. It ran, without any apparent concern, about the room, and allowed even strangers to handle it without attempting to resist the freedom; and after a while, it marched quietly into its cage again.

In a wild state these birds lay three or four eggs at a time, and these are generally of a greenish or greyish colour, beautifully spotted with grass green, and marked towards their smaller end with white. The female deposits them in the sand, and, after having covered them over, leaves them to be hatched by the heat of the sun and the atmosphere. In some countries, however, and under some circumstances, Cassowaries sit upon their eggs like other birds.

One of the late proprietors of the Menagerie at Exeter 'Change, had in his possession a Cassowary which laid four eggs, one at Oxford, one at Warwick, one at Hammersmith, and one at Abingdon, when it was in a caravan for the purpose of exhibition. These eggs were somewhat larger than those of the swan, and of a blue colour with dark specks.

Cassowaries are found only in the south-eastern parts

of Asia; that is, in the peninsula of India beyond the Ganges, and in the islands of the Indian Archipelago: but they are not very numerous in any of these places. The deep forests of the island of Ceram, along the southern coast from Ethiopia almost to Kelemori, contain, however, great numbers of them.

Waders*.

'OF THE HERON TRIBE IN GENERAL†

The different kinds of Herons are very numerous, amounting in the whole to nearly a hundred. They are found in various parts of the world, but chiefly in temperate and hot climates. Several of them are migratory. They have long feet and necks, and live almost wholly on amphibious animals and fishes.

THE COMMON CRANE‡.

These birds are seen in numerous flocks in all the northern parts of Europe. We are told that they make

* In the Waders (or *Gallæ* of Linnæus) the bill is somewhat cylindrical. The thighs are feathered only half-way to the knees; and the legs are longish, and formed for walking.

† The characters of the tribe are: a long, strong, and sharp-pointed bill; linear nostrils, and pointed tongue: toes connected by a membrane as far as the first joint; and the middle claw, in some of the species, pectinated.

‡ DESCRIPTION. This is a large bird, measuring upwards of five feet in length. The bill is more than four inches long. The plumage is, in general, ash-coloured: but the forehead is black; and the sides of the head, behind the eyes, and the hind part of the neck, are white; on the upper part of the neck there is a bare ash-coloured space of two inches; and, above this, the skin is naked and red, with a few scattered hairs.

their nests in marshes, and lay two bluish eggs. They feed on reptiles of all kinds, and on some species of vegetables: while corn is green, they are said to make such havock in the fields as to ruin the farmers, wherever the flocks alight.

They are migratory; returning northward in the spring, (where they generally make choice of the places which they occupied during the preceding season,) and in the winter inhabiting the warmer regions of Egypt and India. They fly very high, and arrange themselves in the form of a triangle, the better to cleave the air. When the wind freshens, and threatens to break their ranks, they collect their force into a circle; and they adopt the same disposition when attacked by powerful birds of prey. Their migratory voyages are chiefly performed in the night; but their loud screams betray their course. During these nocturnal expeditions the leader frequently calls, in order to rally his forces, and to point out the track; and the cry is repeated by the flock, each answering, to give notice that it follows and keeps its rank. The flight of the Crane is always supported uniformly, though it is marked by different inflections: and these variations have been observed to indicate a change of weather. The cries of these birds, during the day, forebode rain; and their noisy and tumultuous screams announce a storm. If, in a morning or evening, they rise upwards, and fly peacefully in a body, it is a sign of fine weather; but if they keep low, or alight on the ground, this menaces a tempest. The Crane seems to have considerable difficulty in commencing its flight. It runs a few steps; opens its wings;

Some parts about the wings are blackish. From the pinion of each wing springs an elegant tuft of loose feathers, curled at the ends; which can be erected at will, but which in a quiescent state hangs over and covers the tail. The legs are black.

SYNONYMS. *Ardea Grus.* Linn.—Grue. Buff.—Penn. Brit. Zool. ii. App. tab. 6.—Bew. Birds. ii. p. 29.

mounts a little way; and then, having a clear space, it displays its vigorous and rapid pinions.

When the Cranes are assembled on the ground, they are said to set guards during the night; and the circum-spection of these birds has even been consecrated in ancient hieroglyphics, as symbols of vigilance.

According to Kolben, Cranes are often observed in large flocks in the marshes about the Cape of Good Hope. He says, that he never saw a flock of them on the ground, which had not some birds placed, apparently as sentinels, on watch, while the others were feeding. These sentinels stand on one leg; and, at intervals, stretch out their necks, as if to observe that all is safe. When notice of danger is given, the whole flock rise on wing and fly away. Kolben goes so far as to assert, that in the night-time each of the watching Cranes "holds, in its right claw a stone of considerable weight; in order that, if overcome by sleep, the falling of the stone may awake it?"

Cranes are seen in France in the spring and autumn; but they are, for the most part, merely passengers. We are told that they formerly visited the marshes of Lincolnshire and Cambridgeshire in vast flocks: but none have of late been met with there. Their flesh is black, tough, and bad.

THE WHITE STORK*.

The White Storks are semi-domestic birds, haunting towns and cities; and, in many places, stalking un-

* See Plate xiii. Fig. 6.

DESCRIPTION. The length of the White Stork is about three feet. The bill is nearly eight inches long, and of a fine red colour. The plumage is wholly white; except the orbits of the eyes, which are bare and blackish: some of the feathers on the side of the back and on the wings are black. The skin, the legs, and the bare part of the thighs, are red.

SYNONYMS. *Ardea Ciconia*. Linn.—Cicogne-blanche. Buff.—Bew. Birds, ii. p. 32.

concernedly about the streets, in search of offal and other food. They remove noxious filth, and clear the fields of serpents and reptiles. On this account they are protected in Holland, and are held in high veneration by the Mahomedans; and so greatly respected were they in times of old by the Thessalians, that to kill one of these birds was a crime expiable only by death.

Bellonius inform us, that "Storks visit Egypt in such abundance, that the fields and meadows are white with them. Yet the Egyptians are not displeased with this sight; as frogs are there generated in such numbers, that did not the Storks devour them, they would over-run every thing. They also catch and eat serpents. Between Belba and Gaza, the fields of Palestine are often rendered desert on account of the abundance of mice and rats; and, were these not destroyed, the inhabitants could have no harvest."

The disposition of the Stork is mild and placid. This bird is easily tamed; and may be trained to reside in gardens, which it will clear of insects and reptiles. It has a grave air, and a mournful visage: yet, when roused by example, it exhibits a certain degree of gaiety; for it joins in the frolics of children, hopping about and playing with them: "In a garden (says Dr. Hermann) where the children were playing at hide-and-sseek, I saw a tame Stork join the party; run its turn when touched; and distinguish the child whose turn it was to pursue the rest, so well, as, along with the others, to be on its guard."

To the Stork the ancients ascribed many of the moral virtues; as temperance, conjugal fidelity, and filial and paternal piety. The manners of this bird are such as were likely to attract peculiar attention. It bestows much time and care on the education of its offspring, and does not leave them till they have strength sufficient for their own support and defence. When they begin to flutter out of the nest, the mother bears them on her wings; she protects them from dan-

ger, and will sometimes perish rather than forsake them. A celebrated story is current in Holland, that, when the city of Delft was on fire, a female Stork in vain attempted several times to carry off her young-ones; and, finding she was unable to effect their escape, suffered herself to be burned with them.

The following anecdote affords a singular instance of sagacity in this bird :—" A wild Stork was brought by a farmer, who resided near Hamburgh, into his poultry-yard, to be the companion of a tame one that he had long kept there; but the tame Stork, disliking a rival, fell upon the poor stranger, and beat him so unmercifully that he was compelled to take wing, and with some difficulty escaped. About four months afterwards, however, he returned to the poultry-yard, recovered of his wounds, and attended by three other Storks, who no sooner alighted than they all together fell upon the tame Stork and killed him.

Storks are birds of passage, and observe great exactness in the time of their autumnal departure from Europe to more favourite climates. They pass a second summer in Egypt and the marshes of Barbary. In the former country they pair; again lay, and educate a second brood. Before each of their migrations, they rendezvous in amazing numbers. They are for awhile much in motion among themselves; and after making several short excursions, as if to try their wings, they suddenly take flight with great silence.

These birds are seldom seen further north than Sweden; and, though they have scarcely ever been found in England, they are so common in Holland as to build on the tops of the houses, wherever the inhabitants provide boxes for them to make their nests in. Storks are also common at Aleppo; and are found in great numbers at Seville, in Spain. At Bagdad, hundreds of their nests are seen about the houses, walls, and trees; and at Persepolis, in Persia, the remains of the pillars serve them for nesting places, " every pillar having a nest upon it."

During their migrations Storks are observed in vast flocks. Dr. Shaw saw three flights of them leaving Egypt, and passing over Mount Carmel, each half a mile in width: and he says they were three hours in passing over.

THE COMMON HERON*.

This is an extremely formidable enemy to the scaly tribes. There is, in fresh waters, scarcely a fish, however large, that the Heron will not strike at and wound, though unable to carry it off: but the smaller fry are his chief subsistence; these, pursued by their larger fellows of the deep, are compelled to take refuge in shallow waters, where they find the Heron a still more formidable enemy. His method is to wade as far as he can go into the water, and there patiently to await the approach of his prey; into which, when it comes within his sight, he darts his bill with inevitable aim. Willughby says he has seen a Heron that had in his stomach no fewer than seventeen carp. Some gentlemen who kept tame Herons, were desirous of ascertaining what average quantity one of these birds would devour. They consequently put several small roach and dace

* DESCRIPTION. The common Heron is about three feet three inches in length. The bill is six inches long, and of a dusky colour. The feathers of the head are long, and form an elegant crest. The neck is white; and on the fore part is marked with a double row of black spots. The general colour of the plumage is blue gray; with the greater wing-quills black. The middle of the back is almost bare, and covered by the loose feathers of the scapulars; the feathers of the neck hang loose over the breast. On each side, under the wing, the feathers are black. The legs are of a dirty green colour, and the inner edge of the middle claw is serrated. The female has no crest, and the feathers on the breast are short.

These birds are very common in England.

SYNONYMS. *Ardea cinerea*. Linn.—Heron. Buff.—Heronshaw. Montagu.—Penn. Brit. Zool. ii. tab. 61.—Bew. Birds. ii. p. 37.

into a tub ; and the Heron, one day with another, ate fifty in a day. Thus a single Heron is able to destroy nine thousand store carp in half a year.

The Heron, though he usually takes his prey by wading, frequently catches it while on wing ; but this is only in shallow waters, where he is able to dart with more certainty than in the deeps ; for in this case, though the fish, at the first sight of its enemy, descends, yet the Heron, with its long bill and legs, instantly pins it to the bottom, and thus seizes it securely. In this manner, after having been seen with its neck for above a minute under water, he will rise on wing with a trout or an eel struggling in his bill. The greedy bird, however, flies to the shore, swallows it, and returns to his fishing.

Heron-hawking was formerly a favourite diversion in this kingdom ; and a penalty of twenty shillings was incurred by any person taking the eggs of this bird. Its flesh was also in former times much esteemed, being valued at a rate equal with that of the peacock.

In their breeding season the Herons unite together in large societies, and build in the highest trees. Sometimes as many as eighty nests have been seen in one tree. The nest is made of sticks, and lined with a few rushes and wool, or with feathers. The eggs are four or five in number, and of a pale-green colour.

If taken young, these birds may be tamed ; but the old birds, when captured, soon pine away, refusing every kind of nourishment.

The different parts of the body of the Heron are admirably adapted to its mode of life. This bird has long legs, for the purpose of wading ; a long neck, answerable to these, to reach its prey in the water ; and a wide throat to swallow it. Its toes are long, and armed with strong, hooked talons ; one of which is serrated on the edge, the better to retain the fish. The bill is long and sharp, having towards the point serratures, which stand backward ; these, after the prey is struck,

act like the barbs of a fish-hook, in detaining it till the bird has time to seize it with its claws. Its broad, large, and concave wings, are of great use in enabling it to carry its load to the nest, which is sometimes at a great distance. Dr. Derham tells us, that he has seen lying scattered under the trees of a large heronry, fishes many inches in length, which must have been conveyed by the birds from the distance of several miles: and D'Acre Barret, Esq. the owner of this heronry, saw a large eel that had been conveyed thither by one of them, notwithstanding the inconvenience that it must have experienced from the fish writhing and twisting about.

The body of the Heron is very small, and always lean; and the skin is said to be scarcely thicker than what is called goldbeater's skin. It is probable that this bird is capable of long abstinence; as its usual food, which consists of fish and reptiles, cannot at all times be had.

THE GIGANTIC CRANE*.

The Gigantic Crane is an inhabitant of Bengal and Calcutta, and is sometimes found on the coast of Gui-

* See Plate xii. Fig. 6.

DESCRIPTION. This is a large species, measuring, from tip to tip of the wings, nearly fifteen feet. The bill is of vast size, somewhat triangular, and sixteen inches round at the base. The head and neck are naked, except a few straggling curled hairs. The feathers of the back and wings are of a bluish ash-colour, and very stout: those of the breast are long. The craw hangs down the fore part of the neck like a pouch. The belly is covered with a dirty-white down; and the upper part of the back and shoulders is surrounded with the same. The legs and half the thighs are naked; and the naked parts are nearly three feet in length.

SYNONYMS. *Ardea dubia.* Linn.—Argil, or Hargal. Ives.—Boorong, Cambing, Booring-volar. Marsden.—Argali, Pok-koe. Bosman.—Latham's *Synopsis*, vol. iii.

nea. It arrives in the interior parts of Bengal before the period of the rains, and retires as soon as the dry season commences. Its aspect is filthy and disgusting; yet it is an extremely useful bird, in consequence of the snakes, noxious reptiles, and insects which it devours. It seems to finish the work that is begun by the jackal and vulture: these clear away the flesh of animals, and the Gigantic Cranes remove the bones by swallowing them entire. They sometimes feed on fish; and one of them will devour as much as would serve four men to dinner. On opening the body of a Gigantic Crane, there were found in its craw a land tortoise, ten inches long, and in its stomach a large black cat. Being altogether undaunted at the sight of mankind, these birds are soon rendered familiar; and when fish or other food are thrown to them, they catch them very nimbly, and immediately swallow them.

The Indians believe that these Cranes are invulnerable, and that they are animated by the souls of the Bramins. They are held in the highest veneration both by the Indians and Africans. Mr. Ives, in attempting to kill some of them with his gun, missed his shot several times: this the bystanders observed with great satisfaction, telling him triumphantly that he might shoot at them as long as he pleased, but that he would never be able to kill any of them.

There seems no doubt that this is the species mentioned by Mr. Smeathman, as having been seen by him in Africa. The birds that he describes were at least seven feet high, and appeared at a distance not unlike *grey-headed men*. On the middle of the neck before, there was a long conic membrane, like a bladder, covered sparingly with short down, and rising or falling as the animals moved their beaks, but always appearing inflated.

These birds are found in companies; and, when seen at a distance, near the mouths of rivers, coming towards an observer, (which they do with their wings extended,) they may be mistaken for canoes on the surface of a

smooth sea; and when stalking about on the sand-banks, they appear like men and women picking up shell-fish on the beach.

A young bird of this kind, about five feet in height, was brought up tame, and presented to the Chief of the Bananas, where Mr. Smeathman lived; and in whose house it soon became perfectly familiar. It regularly attended the hall at dinner-time; and placed itself behind its master's chair, frequently before any of the guests entered. The servants were obliged to watch it carefully, and to defend the provisions by beating it off with sticks; yet, notwithstanding every precaution, it would frequently snatch off something from the table. It one day purloined a whole boiled fowl, which it swallowed in an instant. This bird used to fly about the island, and roost very high among the silk-cotton trees: from this station, at the distance of two or three miles, it could see when the dinner was carried across the court. As soon as this appeared it would dart down, and arrive early enough to enter with some of those who carried in the dishes.

When sitting, it was observed always to rest itself on the whole length of the hind part of the leg. It sometimes stood in the room for half an hour after dinner; turning its head alternately, as if listening to the conversation. The courage of this bird was not equal to its voracity: for a child eight or ten years of age was able to put it to flight; though it would seem at first to stand on the defensive, by threatening with its enormous bill widely extended, and crying out with a loud, hoarse voice.

It preyed on small quadrupeds, birds, and reptiles; and, though it would destroy poultry, it never dared openly to attack a hen with her young-ones. It had been known to swallow a cat whole; and a bone of a shin of beef being broken, served it but for two morsels.

In the month of January, 1820, I saw, in the menagerie at Exeter 'Change, a Gigantic Crane, which had

been there about twelve months. It was so tame as to be suffered, for the amusement of the spectators, to walk out of its cage, into the exhibition-room; and its grotesque appearance and long strides, excited much laughter among the juvenile part of the company. This bird could, without difficulty, swallow a rabbit or a fowl. It loved to stand on elevated places; and one day, whilst perched upon a cage, its anger was excited by a gentleman teasing it, and it struck its bill quite through the crown of his hat.

THE BITTERN*.

This is a very retired bird; dwelling among the reeds and rushes of extensive marshes, where it leads a solitary life, hid equally from the hunter whom it dreads, and the prey that it watches. It continues for whole days about the same spot, and seems to look for safety only in privacy and inaction.

In the autumn it changes its abode, always commencing its journey or change of place at sunset. Its precautions for concealment and security seem directed with great care and circumspection. It usually sits in the reeds with its head erect; by which, from its great

* **DESCRIPTION.** The Bittern is not so large as the common heron. Its bill also is weaker, and not more than four inches long. The gape, however, is so wide, that the eyes seem placed in the bill. The crown of the head is black; the feathers on the hind part forming a sort of pendent crest. The plumage is of a pale dull yellow, variously marked with black. Some parts about the wings are of a bright rust-colour, barred with black. The tail is very short; and the feathers on the breast are long and loose. The legs are of a pale green colour; the claws long and slender; and the inside of the middle claw is serrated, for the better holding of its prey.

SYNONYMS. *Ardea stellaris.* Linn.—Butor. Buff.—Bit-tour, Miredruin. Willughby.—Bumpy-coss, Butter-bump. Montague.—Myredromble. Turner.—*Bew. Birds*, ii. p. 47.

length of neck, it sees over their tops, without being itself perceived by the sportsman.

The principal food of the Bittern, during summer, consists of fish and frogs; but in the autumn these birds resort to the woods in pursuit of mice, which they seize with great dexterity, and always swallow whole. About this season they usually become very fat.

The Bittern is not so stupid a bird as the heron, but it is greatly more ferocious. When caught, it exhibits much rancour, and strikes chiefly at the eyes of its antagonist. Few birds make so cool a defence: it is never itself the aggressor; but, if attacked, it fights with the greatest intrepidity. If darted on by a bird of prey, it does not attempt to escape; but, with its sharp beak erected, receives the shock on the point, and thus compels its enemy to retreat, sometimes with a fatal wound.

When wounded by the sportsman, it often makes a severe resistance. It does not retire; but waits his onset, and gives such vigorous pushes with its bill, as to wound the leg even through the boot. Sometimes it turns on its back, like the rapacious birds, and fights both with its bill and claws. When surprised by a dog, it is said always to throw itself into this posture. Mr. Markwick once shot a Bittern in frosty weather: it fell on the ice, which was just strong enough to support the dogs, and they immediately rushed forward to attack it; but being only wounded, it defended itself so vigorously, that the dogs were compelled to leave it, till it was fired at a second time and killed.

During the months of February and March, the males make a kind of deep lowing noise in the mornings and evenings. This is supposed to be the call to the females, and to be produced by a loose membrane, situated at the entrance of the throat, capable of great extension. The noise was formerly believed to be made while the bird plunged its bill into the mud; hence Thomson:

—so that scarce
The Bittern knows his time, with bill ingulf'd
To shake the sounding marsh.

The nest of the Bittern is formed in April, among rushes; and almost close to the water. The female lays four or five greenish eggs, and sits on them for about twenty-five days. The young-ones, when hatched, are naked and ugly, appearing almost all legs and neck; they do not venture abroad till about twenty days after their extrusion. During this time, the parents feed them with snails, small fish, or frogs. It is said that the hawks, which plunder the nests of most of the marsh-birds, seldom dare to attack those of the Bittern, on account of the old ones being always on their guard to defend their offspring.

A female Bittern, which was killed during the frost in winter, was found to have in her stomach several warty lizards, quite perfect, and the remains of some toads and frogs. These were supposed to have been taken out of the mud, under shallow water, in the swamp where the bird was shot.

In the reign of Henry the Eighth, the Bittern was held in great esteem at the tables of the great. Its flesh has much the flavour of hare, and is far from being unpleasant: even now the poulterers value this bird at about half-a-guinea.

OF THE SNIPE TRIBE IN GENERAL.

In this tribe the bill is long, slender, weak, and straight. The nostrils are linear, and lodged in a furrow. The head is entirely covered with feathers. The feet have each four toes; the hind one of which is very short, and consists of several joints.

THE CURLEW*.

Large flocks of Curlews are frequently seen, in the

* DESCRIPTION. These birds differ much in size; some of

winter season, on the sea-coasts, running about upon the sands, and feeding on shell-fish, crabs, and marine insects: they are also found in marshes, where they subsist on small frogs, snails, insects, and worms. Their bill is so long, weak, and slender, that it is calculated only for digging into soft mud or earth, in search of prey.

Both the English and French names of this bird are evidently derived from its cry.

In summer-time the Curlews retire to mountainous and unfrequented parts of the country, where they pair and breed. The eggs, which are four in number, are of a pale olive colour, marked with irregular but distinct spots of brown.

Curlews are not only found in England, but also in Italy, France, and Germany; and they advance in the summer-time as far north as the Baltic Sea, and the Gulf of Bothnia. They pass the island of Malta twice a year, in the spring and autumn, in their migrations across the Mediterranean.

Their flesh, as food, varies much in quality, according to the season and the place in which the birds have fed. Those that are shot on the moors, are always better than such as are killed on the sea-coasts or in the marshes.

them weighing thirty-seven, and others not twenty-two ounces. The head, neck, and coverts of the wings are of a pale brown colour, and the middle of each feather is black. The breast and belly are white, marked with narrow oblong black lines. The back is white, spotted with a few black strokes. The quill-feathers are black, but the inner webs are spotted with white. The tail is white, tinged with red, and beautifully barred with black. The legs are long, strong, and of a bluish gray colour. *Pennant.*

SYNONYMS. *Scolopax arquata.* *Linnaeus.*—Le Courlis. *Buffon.*—Courlis and Turlis in France.—*Bew. Birds*, ii. p. 54.

THE WOODCOCK¹.

During the summer-time the Woodcock is an inhabitant of Norway, Sweden, Lapland, and other northern countries, where it breeds. As soon, however, as the frosts commence, it retires southward to milder climates. These birds arrive in Great Britain, some of them in October, but not in great numbers till November and December. They generally take advantage of the night, being seldom seen to come before sunset. The time of their arrival depends much on the prevailing winds: adverse gales always detain them, for they are not able to struggle with the boisterous squalls of the Northern Ocean. After their arrival in bad weather, they have often been seen so much exhausted as to allow themselves to be seized with the hand when they alighted near the coast.

They live on worms and insects; which they search for with their long bills in soft ground and moist woods, feeding and flying principally in the night. They go out in the evening, and generally return in the same direction, or through the same glades, to their day retreat.

Most of the Woodcocks leave this country about the end of February or the beginning of March, always pairing before they set out. They retire to the coast, and, if the wind be fair, they set out immediately; but, if contrary, they are often detained in the neighbouring woods and thickets for some time. In this crisis the sportsmen are all on the alert, and the whole surrounding country echoes the discharge of guns: seventeen brace have been killed by one person in a day. If they are detained long on the dry heaths, they become so lean as to be scarcely eatable. The instant a fair wind springs up, they seize the opportunity; and where the

* **SYNONYMS.** *Scolopax Rusticola.* *Linnaeus.* — *Becasse.* *Buffon.* — *Penn. Brit. Zool.* ii. tab. 65. — *Bew. Birds,* ii. p. 60.

sportsman has seen hundreds in one day, he will not perhaps find a single bird the next.

Very few Woodcocks breed in England; and those that do may have been so wounded by sportsmen in the winter, as to be disabled from taking their long journey in spring. They construct their nests on the ground, generally at the root of some tree; and lay four or five eggs, about the size of those of a pigeon, of a rusty colour, and marked with brown spots. These birds are remarkably tame during incubation: a person who discovered a Woodcock on its nest, often stood over, and even stroked it; notwithstanding which, it hatched its young-ones, and, in due time, disappeared with them.

A single bird was observed to remain through the summer, in a coppice belonging to a gentleman in Dorsetshire. The place, from its shady and moist situation, was well calculated to maintain it; yet by degrees this bird lost nearly all its feathers, so that for some time it was not able to fly, and was often caught; but in the autumn it recovered its feathers and strength, and flew away.

It has been remarked in England, that for several years past, Woodcocks have become very scarce. This is easily accounted for. Sweden, like other countries, is making a gradual progress in the arts of luxury; among which the indulgence of the palate fills no undistinguished place. The eggs of wild-fowl have of late become a great delicacy among the inhabitants of that country, who encourage the peasantry to find out their nests. The eggs of Woodcocks they are particularly fond of; and the peasants offer them in large quantities for sale, in the markets of Stockholm. From this practice, it is not improbable that the breed, not only of this bird, but of several of the species of grouse, will be greatly diminished, if not at last totally extirpated.

The inhabitants of the north of Europe, to whose forests Woodcocks retire in the summer, never eat them: they esteem their flesh unwholesome, from their having no crops.

In Lancashire, great numbers of Woodcocks are taken by means of traps in moonlight nights. Long parallel rows of stones or sticks, four or five inches high, are made on the commons which they frequent. In these rows several intervals or gateways are left, in which the traps are placed. When the bird, running about in search of food, comes to one of these rows, he will not cross it, but runs along the side till he comes to a gateway, which he enters, and in which he is caught.

THE COMMON SNIPE*, AND JACK SNIPE†.

It is stated that the Common Snipes never frequent woods; but that, during the winter season, they are very common in wet meadows, pastures, and marshes, where they lie concealed among the rushes, carices, and osiers, which grow upon the borders of the streams. When roused by the approach of the sportsman or his dogs, they utter a feeble whistle, and generally fly off against the wind, turning nimbly, in a zig-zag direction, for a considerable distance, and sometimes soaring almost beyond the reach of vision.

In severe frosts, Snipes, driven by the extremity of weather, resort to sheltered springs, unfrozen boggy places, or any open streamlet of water. Here they are often found in large flights, and so subdued by cold or hunger, that they will sit till nearly trodden upon before they will take flight.

These birds feed on small worms, on slugs, and the larvæ of insects, in search of which they are constantly

* **SYNONYMS.** *Scolopax gallinago*. *Linn.*—Le Bécassine. *Buff.*—Heather Bleater, in the north of England.—*Bewick's Birds*, ii. p. 68.

† **SYNONYMS.** *Scolopax gallinula*. *Linnaeus*.—La petite Bécassine, surnommée la sourde. *Buffon*.—In some parts of France this bird is called Bécet, Jaquet, and Deux pour Un.—Judcock and Gid, in several parts of England.—*Bew. Birds*, ii. p. 73.

digging and nibbling with their bills in the soft mud.

In the summer-time they disperse to different parts, and, at this season, are to be found even among the highest mountains, as well as on the lowest and most extensive moors. They are migratory, a considerable portion of them leaving Great Britain in the spring of the year, and returning in the autumn. Many, however, remain with us through the whole year. These make their nests of dried grass and feathers, in the most retired and inaccessible parts of the marshes, and generally under the stump of an alder-tree or a willow. The female lays four eggs, of a dirty olive-colour, marked with dusky spots. The young-ones are able to run off almost immediately after they are freed from the shell; but they are attended by the parent birds until their bills have acquired sufficient firmness to enable them to provide for themselves.

During the breeding season these birds play over the moors, piping and humming, in a most pleasing manner. This humming, which is always heard when the bird descends, is supposed by the Rev. Mr. White, either to be ventriloquous, like that of the turkey, or else to be produced by the motion of the wings. It is also amusing to observe the male bird, whilst his mate sits upon her eggs, poise himself, as he frequently does, on his wings, making sometimes a whistling, and sometimes a humming noise.

There are no birds more generally esteemed for the table than these. They much resemble the woodcock in flavour, but are more delicate eating. Like the woodcock, they are cooked without having the entrails extracted; and though generally very fat, they seldom cloy even the weakest stomach.

The Rev. Mr. Daniel states, that, about thirty years ago, Snipes were so abundant in the fens of Cambridge-shire, that as many were taken in Milton fen, by means of a lark-net, in one night, and by a single man, as could be contained in a small hamper.

In most respects the habits of the *Jack Snipe* resemble those of the common species. Its flight, however, is swifter and more direct. From the circumstance of its not rising until almost trodden upon, the French sportsmen have given to this bird the appellation of *la sourde*, or *deaf*. From the silky and somewhat filamentary appearance of the feathers, the Germans denominate it *haar schnepffe*, or "hair snipe."

The species are either not very numerous, or are not very generally dispersed in this country. They continue with us almost the whole year. They breed in the marshes, and their eggs are of the same colour as those of the Common Snipe, but are considerably smaller in size; not being much larger, says Mr. Pennant, than those of the lark.

OF THE SANDPIPERS IN GENERAL.

The Sandpipers have a straight and slender bill, about an inch and a half long; small nostrils; and a slender tongue. The toes are divided, or are very slightly connected at the base by a membrane; the hinder toe is short and weak.

THE RUFF AND REEVE*.

The name of *Ruff* has been given to the male of this species, from the long feathers which stand out on the back part of the head and neck, and which remind a

* See Plate xiii. Fig. 7.

DESCRIPTION. The Ruff is about a foot in length, with a bill about an inch long. The face is covered with yellow pimples. A few of the feathers of the Ruff stand up over each eye, and appear not unlike ears. The colours of the Ruffs are in no two birds alike: in general they are brownish, and barred with black; though some have been seen that were altogether white. The lower parts of the belly and the tail-coverts are white. The tail is tolerably long, having the four middle feathers barred with black: the others are pale brown. The legs

casual observer of the ruffs that were worn by our ancestors. The female, which is called the *Reeve*, is destitute of this singular appendage.

The male bird does not acquire his ruff till the second season; and till that time he is in this respect like the female; as he is also annually from the end of June until the pairing season. After the time of incubation, the long feathers fall off, and the caruncles shrink in under the skin, so as not to be discerned.

These are birds of passage; and arrive in the fens of Lincolnshire, the Isle of Ely, and the East Riding of Yorkshire, in the spring. Mr. Pennant tells us, that in the course of a single morning, more than six dozen have been caught in one net; and that a fowler has been known to catch between forty and fifty dozen in a season.

The males are much more numerous than the females, and they have many severe contentions for their mates. The male chooses, near a splash of water, on some dry bank, a stand, round which he runs so often, as to make a bare circular path: the moment a female comes in sight, all the males within a certain distance commence a general battle; placing their bills to the ground, spreading the feathers of their neck, and using the same action as a cock: and this opportunity is seized by the fowlers, who, in the confusion, catch them, by means of nets, in great numbers.

An erroneous opinion prevails very generally, that Ruffs when in confinement must be fed in the dark, lest the admission of light should induce them to fight. The fact is, that every bird, even when kept in a room, takes its stand, as it would in the open air; and if another invade its circle, a battle ensues. A whole roomful of them may be set into fierce contest by compelling

are of a dull yellow, and the claws black. The female is smaller than the male, and of a brown colour.

SYNONYMS. *Tringa pugnax.* *Linnaeus.*—*Combatant*, ou *Paon de Mer.* *Buffon.*—*Penn. Brit. Zool. vol. ii. tab. 69.*—*Bew. Birds, ii. p. 96.*

them to shift their stations; but, after the disturber has quitted the place, they have been observed to resume their circles, and become again pacific. In confinement, their quarrels usually originate in the pan containing their food not being sufficiently large to admit the whole party to feed, without touching each other. When the food has been divided into several pans, the birds have continued perfectly quiet.

The Reeves lay four eggs in a tuft of grass, about the beginning of May; and the young-ones are hatched in about a month. It is not known with certainty in what countries these birds pass the winter.

THE LAPWING*.

The chief food of Lapwings consists of worms; and sometimes these birds may be seen in flocks, nearly covering the low marshy grounds, in search of worms, which they draw with great dexterity from their holes. When a Lapwing meets with one of those little clusters of pellets, or rolls of earth, that are thrown out by the worm's perforations, it first gently removes the mould from the mouth of the hole, then strikes the ground at the side with its foot, and steadily and attentively waits the issue: the worm, alarmed by the shock, emerges from its retreat, and is instantly seized. "To ascertain this circumstance, (says M. Baillon,) I employed a similar stratagem: in a field of green corn, and in the garden, I beat the earth for a short time, and saw the worms coming out. I pressed down a stake, which I then turned in all directions to shake the soil: this method succeeded still quicker; the worms crawled out in crowds, even at the distance of a fathom from the stake." In the evening the Lapwings pursue a diffe-

* SYNONYMS. *Tringa Vanellus*. *Linnaeus*.—*Vanneau*. *Buffon*.—Lapwing, or Bastard Plover. *Willughby*.—*Bew. Birds*, i. p. 324.

rent plan: they run along the grass, and feel under their feet the worms, which now come forth, invited by the dampness of the atmosphere. Thus they obtain a plentiful meal; and afterwards wash their bill and feet in the small pools or rivulets.

"I have seen this bird (says Dr. Latham) approach a worm-cast, turn it aside, and after making two or three turns about, by way of giving motion to the ground, the worm came out, and the watchful bird, seizing hold of it, drew it forth."

Lapwings are found in most parts of Europe, as far northward as Iceland; and in the winter they are met with in Persia and Egypt. In England they remain during the whole year. The female lays two eggs on the dry ground, near some marsh, upon a little bed which she prepares, of dry grass. These are olive-coloured, and spotted with black. She sits about three weeks; and the young-ones are able to run within two or three days after they are hatched.

The parent exhibits the greatest attachment to them; and the arts used by this bird to allure boys and dogs from the place where they are running, are extremely amusing. She does not wait the arrival of her enemies at the nest, but boldly pushes out to meet them. When she has approached as near as she dare venture, she rises from the ground with a loud screaming voice, as if just flushed from hatching, though probably she is not at the time within a hundred yards of her nest. She now flies with great clamour and apparent anxiety; whining and screaming round the invaders, striking at them with her wings, and sometimes fluttering as if she was wounded. To complete the deception, she becomes still more clamorous as she retires from the nest. If very near, she appears altogether unconcerned; and her cries cease in proportion as her fears are augmented. When approached by dogs, she flies heavily, at a little distance before them, as if maimed; still vociferous, and still bold, but never offering to move towards the quarter where her young-ones are stationed. The

dogs pursue, in expectation every moment of seizing the parent, and by this means actually lose the offspring; for the cunning bird, having thus drawn them off to a proper distance, exerts her powers, and leaves her astonished pursuers to gaze at the rapidity of her flight.

The following anecdote, inserted in Mr. Bewick's History of British Birds, exhibits the domestic nature of the Lapwing; as well as the art with which it conciliates the regard of animals materially differing from itself, and generally considered as hostile to every species of the feathered tribe. Two Lapwings were given to a clergyman, who put them into his garden; one of them soon died, but the other continued to pick up such food as the place afforded, till winter deprived it of its usual supply. Necessity soon compelled it to draw nearer to the house; by which it gradually became familiarized to occasional interruptions from the family. At length one of the servants, when she had occasion to go into the back-kitchen with a light, observed that the Lapwing always uttered his cry of "*Pee-wit*," to obtain admittance. The bird soon grew more familiar; as the winter advanced he approached as far as the kitchen; but with much caution, as that part of the house was generally occupied by a dog and cat, whose friendship, however, the Lapwing at length conciliated so entirely, that it was his regular custom to resort to the fire-side as soon as it grew dark, and spend the evening and night with his two associates, sitting close by them, and partaking of the comforts of the warmth. As soon as spring appeared, he discontinued his visits to the house, and betook himself to the garden; but on the approach of winter, he had recourse to his old shelter and friends, who received him very cordially. Security was productive of insolence; what was at first obtained with caution, was afterwards taken without reserve: he frequently amused himself with washing in the bowl which was set for the dog to drink out of; and while he was thus employed, he showed marks

of the greatest indignation, if either of his companions presumed to interrupt him. He died in the asylum he had thus chosen, being choked with something that he had picked up from the floor.

THE TURNSTONE *.

This bird is found on various parts of the English and Scottish coasts, and in North America. It has its English name from its custom of turning over stones, in order to prey upon the insects and worms concealed beneath them.

When Mr. Catesby was on his voyage to North America, one of these birds, about forty leagues from the coast of Florida, flew on board the vessel. It was put into a cage, and showed much activity in turning up stones that were put to it: but not finding under them its proper food, it soon died. In this action it was observed to move only the upper mandible of its bill, yet it was able, with great dexterity and quickness, to turn over stones of three pounds weight.

The Turnstone makes its nest in the sand, and lays three or four olive-coloured eggs, spotted with black. At the time of hatching, it has so much courage, as to attack both men and dogs when they approach its nest.

OF THE PLOVERS IN GENERAL†.

Most of these birds are found about the mouths of

* DESCRIPTION. The Turnstone is about the size of a thrush; its bill is black, about an inch in length, and a little turned up at the end. The body is black, variously marked with white and rust-colour on the upper parts: the breast and belly are white. The legs are short and orange-coloured.

SYNONYMS. *Tringa Interpres*. Linn.—Tourne-pierre. *Buffon*.—Sea Dottrel. *Willughby*.

† The Plovers have a straight, somewhat cylindrical and

great rivers, and in the neighbourhood of torrents; but two of the English species, the Norfolk and the Golden Plover, frequent heaths and moors.

THE DOTTEREL*.

These birds are migratory; appearing in flocks of eight or ten, about the end of April, and continuing all May and June, when they become very fat, and are much esteemed for the table. They are found in tolerable plenty in Cambridgeshire, Lincolnshire, and Derbyshire; but in other parts of the kingdom they are scarcely known. They are supposed to breed among the mountains of Westmorland and Cumberland.

The Dotterel is in its manners a singular bird, and may be taken by an extremely simple artifice. The country people are said sometimes to go in quest of it, in the night, with a lighted torch or candle; and the bird, on these occasions, will mimic the actions of the fowler with great archness. When he stretches out an arm, it stretches out its wing; if he move a foot, it

obtuse bill, seldom longer than the head. The feet are formed for running, with three toes, all placed forwards.

* **DESCRIPTION.** The length of the Dotterel is about ten inches. The bill is not quite an inch long, and is black. The forehead is mottled with brown and gray: the top of the head is black; and over each eye there is an arched line of white, which passes to the hind part of the neck. The cheeks and throat are white: the back and wings are of a light brown, inclining to olive, each feather margined with pale rust-colour. The fore part of the neck is surrounded by a broad band of a light olive-colour, bordered below with white. The breast is of a pale dull orange: the middle of the belly black; and the rest of the belly and the thighs are of a reddish white. The tail is olive brown, black near the end, and tipped with white; and the outer feathers are margined with white. The legs are of a dark olive.

SYNONYMS. *Charadrius Morinellus.* Linn.—Petit Pluvier, ou Guignard. Buffon.—Bew. Birds, i. p. 334.—Penn. Brit. Zool. vol. ii. tab. 73.

moves one also; and every other motion it endeavours to imitate. This is the opportunity that the fowler takes of entangling it in his net. Willughby states, that formerly, six or seven persons usually went in company to catch Dotterels. When they found the bird, they set their net in an advantageous place; then each of them with a stone in either hand, getting behind it, and striking the stones often one against the other, they roused it from its natural sluggishness, and, by degrees, drove it into the net. The more certain method of the gun, has of late nearly superseded both these artifices.

THE LONG-LEGGED OR STILT PLOVER*.

Of the Stilt Plover Mr. White has given us a very pleasing description: "In the last week of April, 1779, five of these most rare birds were shot upon the verge of Frensham Pond; a large lake belonging to the Bishop of Winchester, and lying between Woolmer Forest and the town of Farnham, in the county of Surry. The pond-keeper says, there were three brace in the flock; but that after he had satisfied his curiosity, he suffered the sixth bird to remain unmolested.

"One of these specimens I procured; and found the length of the legs to be so extraordinary, that, at first sight, one might have supposed the shanks had been fastened on, to impose on the credulity of the beholder: they were legs *in caricatura*; and had we seen such proportions on a Chinese or Japan screen, we should have made large allowance for the *fancy* of the draughtsman.

"These birds are of the Plover family, and might with propriety be called the *Stilt Plovers*. My spe-

See Plate xiii. Fig. 8.

SYNONYMS. *Charadrius himantopus*. *Linnaeus*.—Echasse. *Buff.*—Long Legs. *Ray*.—Long-legged Plover. *Pennant*.—*Bew. Birds*, ii. p. 4.

cimen, when drawn and stuffed with pepper, weighed only four ounces and a quarter, though the *naked* part of the thigh measured three inches and a half. Hence we may safely assert, that these birds exhibit weight for inches, and have incomparably the greatest length of legs of any known bird. The *Flamingo*, for instance, is one of the most long-legged birds, and yet it bears no manner of proportion to the *Himantopus*: for a cock *Flamingo* weighs, at an average, about four pounds avoirdupois; and his legs and thighs measure usually about twenty inches. But four pounds are fifteen times and a fraction more than four ounces and a quarter; and if four ounces and a quarter have eight inches of legs, four pounds must have one hundred and twenty inches and a fraction of legs, or somewhat more than ten feet; such a monstrous proportion as the world never saw*! If we try the experiment in still larger birds, the disparity would increase. It must be matter of great curiosity to see the *Stilt Plover* move; to observe how it can wield such a length of lever with such feeble muscles as the thighs seem to be furnished with. At best, one should expect it to be but a bad walker: but what adds to the wonder is, that it has no back toe. Now, without that steady prop to support its steps, it must, theoretically, be liable to perpetual vacillations, and seldom able to preserve the true centre of gravity.

"These long-legged Plovers are birds of South Europe, and rarely visit our island; and, when they do, they are wanderers and stragglers, and impelled to make so distant and northern an excursion, from motives or accidents for which we are not able to account."

This bird is common in Egypt and the warmer parts of America, where it feeds on flies and other insects.

* It ought here to be remarked, that Mr. White appears to have calculated the weights of these birds unfairly; the *Plover* after it was stuffed, and the *Flamingo* from a perfect bird; which, in the comparison of weights, will make a difference extremely material.

OF THE RAIL TRIBE*.

There are few countries of the world in which some of the species of this tribe are not found. Most of them reside in the neighbourhood of marshes and morassy places, where they subsist on worms, snails, and insects. The females construct their nests on the ground, and generally rear very numerous broods.

THE LAND RAIL†.

The harsh cry of this bird, which somewhat resembles the word *crek*, *crek*, *crek*, is by no means unlike the noise made by stripping forcibly the teeth of a large comb under the fingers. It is chiefly heard in the summer season, among the long grass and corn. Here the bird constantly skulks, hidden by the thickest part of the herbage, winding and doubling, in every direction, in such manner that it is generally difficult for any person to come near it. When hard pushed by the sportsman or his dogs, it sometimes stops short, and its too eager pursuers overshoot the spot, and lose all trace of it.

So uncommon is the Land Rail in some parts of

* The bill is thickest at the base, attenuated on the back towards the tip, compressed, a little incurved, and pointed. The tongue is rough at the tip. The body is compressed, and the tail short. The feet have each four toes.

† DESCRIPTION. The bill of the Land Rail is short, strong, and thick. The feathers on the crown of the head, the hind part of the neck, and the back, are black edged with bay. The coverts of the wings are of the same colour; but not spotted. The tail is short and of a deep bay. The belly is white, and the legs are ash-coloured. These birds generally weigh from six to eight ounces.

SYNONYMS. *Rallus crex*. Linn.—Le Rale de genet, ou Roi des Cailles. Buffon.—Crake Gallinule. Penn.—Land Hen. Willughby.—Daker Hen, in several parts of England.—Bew. Birds, i. p. 325.

Hampshire, that, a few years ago, the common people of the village of Emsworth were thrown into a state of great alarm, by the presence of one of them in their fields. Unable to account for the very extraordinary noise that was heard, many of them attributed it to supernatural agency.

Ill calculated as, from the shortness of its wings, and the position and length of its legs, this bird appears to be for flight, it certainly is able to fly with considerable swiftness. It is, in general, very unwilling to rise from the ground; and such is its timidity, that it will sometimes squat so close as to suffer itself to be taken up into the hand rather than rise.

It is a bird of passage, generally making its appearance about the same time with the quail. Its well-known cry is usually first heard when the grass becomes long enough to afford it shelter. It appears in the Island of Anglesea, about the twentieth of April, after a passage, as it is supposed, from Ireland. On the first arrival of these birds in the island, it is usual for one sportsman to shoot as many as seven or eight of them in a morning.

It appears that Land Rails frequent the fields more for the sake of snails, slugs, and other vermes which abound in such places, than for the grain or seeds they might find there. This is confirmed by the observation of the Rev. Mr. White, that in the gizzard of one of these birds, he had found several small shell-snails, some of them whole, and many ground to pieces through the attrition occasioned by the muscular force and motion of that member. The entrails were so soft and tender, that, in appearance, they might have been dressed like the ropes of a woodcock.

The female constructs her nest on the ground, of moss and dry grass, negligently put together. The number of eggs is generally about ten or twelve, of a pale ash-colour, marked with ferruginous spots. The young-ones are able to run as soon as they have burst the shell.

Land Rails are not only found throughout the whole

continent of Europe, but likewise in several parts both of Asia and Africa.

OF THE FLAMINGO TRIBE.

The Flamingoes combine the characters of the two Linnean orders, the Waders and the Swimmers*. They have long neck and legs. Their bill is thick, large, and bending in the middle. The higher part of the upper mandible is keel-shaped; the lower compressed. The edges of the upper mandible are sharply indented; those of the lower transversely furrowed. The nostrils are covered above with a thin plate, and are pervious. The tongue is cartilaginous, and pointed at the end; the middle part is muscular, and the upper part aculeated. The neck is long. The legs and thighs are of great length: the feet are webbed; and the back toes very small.

THE RED FLAMINGO †.

When the Europeans first visited America, they found the Flamingoes on the shores tame and gentle, and no way distrustful of mankind. If one of them was killed, the rest of the flock, instead of attempting to fly, only regarded the fall of their companion with a kind of fixed astonishment: another and another shot was discharged; and thus the fowler often levelled the whole flock, without one of them attempting to escape. Now, however, they regard us with

* *Grallæ and Anseres.*

† *See Placæ xii. Fig. 7.*

DESCRIPTION. The body of the Red Flamingo is about the size of that of a goose; but its legs and neck are of such extraordinary length, that when it stands erect it is upwards of six feet in height. The body is of a beautiful scarlet. It is an inhabitant of those parts of America that are as yet but thinly peopled.

SYNONYMS. *Phœnicopterus ruber.* Linn.—*Flamant.* Buff.—*Latham's Synopsis*, iii. tab. 93.

aversion. Wherever they haunt, one of the number, it is said, is always appointed to watch while the rest are employed in feeding; and the moment he perceives the least danger, he gives a loud scream, in sound not much unlike a trumpet, and instantly the whole flock is on wing. They feed in silence; but, when thus roused, they all join in the noise, and fill the air with their screams.

Their nest is of a singular construction. It is formed of mud, in the shape of a hillock, with a cavity at the top. In this the female generally lays two white eggs, of the size of those of a goose, but longer. The hillock is of such a height as to admit of the bird's sitting on it, or rather standing, as her legs are placed one on each side at full length. Linnæus tells us that she will sometimes lay her eggs on the projecting part of a low rock, if it happen to be sufficiently convenient to admit of the legs being placed in this manner on each side.

It is not until a long time after they are hatched that the young-ones are able to fly; but they can previously run with amazing swiftness. They are sometimes caught at this age; and, very different from the old ones, they suffer themselves to be carried away, and are easily tamed. In five or six days they become familiar, and will even eat out of the hand; and they drink a surprising quantity of sea-water. But, though easily rendered domestic, it is difficult to rear them; as they are apt to decline, from the want of their natural food.

Flamingoes are often met with in the warmer parts of the Old Continent; and, except in the breeding-time, they are generally found in great flocks. When seen at a distance, they appear like a regiment of soldiers; being often ranged alongside of one another on the borders of rivers, searching for food, which consists principally of small fish and water-insects: these they take by plunging the bill and part of the head into the water; and from time to time trampling the bottom with their feet, to disturb the mud in order to raise up their

prey. In feeding, they are said to twist their neck in such a manner, that the upper part of the bill is applied to the ground.

These beautiful birds were much esteemed by the Romans, who often used them in their grand sacrifices and sumptuous entertainments. Their flesh is thought tolerably good food; and the tongue was considered by the ancients as among the most delicate of all eatables. Pliny, Martial, and many other writers speak of it in high terms of commendation.

Swimmers*.

OF THE DUCK TRIBE IN GENERAL.

The bill in this tribe (which comprehends Swans and Geese, as well as Ducks) is strong, broad, flat, and generally furnished at the end with a kind of nail: the edges of the mandibles are marked with sharp serratures. The nostrils are small and oval. The tongue is broad, having the edges fringed near the base. The toes are four in number, three before and one behind: the middle one is the longest.

THE HOOPER, OR WHISTLING SWAN†.

This species is an inhabitant of the northern regions; never appearing in England, except in hard

* In the *Anseres* or Swimmers, the bill is smooth, obtuse at the point, and covered with a membranaceous skin. The legs are short and compressed; and the feet formed for swimming, the toes being connected by a membrane.

† DESCRIPTION. The Whistling Swan is somewhat smaller than the tame species. The bill is three inches long; yellowish white to the middle, but black at the end. The whole plumage is white; and the legs are black.

SYNONYMS. *Anas Cygnus*. Linn.—Cygne sauvage. Buff.—Wild Swan, Elk, Hooper. Willughby.

winters, when flocks of five or six are now and then seen. Martin states, that in the month of October, Swans come in great numbers to Lingey, one of the Western Isles, and continue there till March, when they return northward to breed. A few continue in Mainland, one of the Orkneys, and breed in the little islands of the fresh-water lochs; but the principal part of them retire at the approach of spring. They are called the Countryman's Almanack; for their quitting the island is said to presage good weather, and their arrival the reverse.

• In Iceland these birds are an object of chase. In the month of August they lose their feathers to such a degree, as not to be able to fly. The natives, at that season, resort in great numbers to the places where they most abound; and are accompanied with dogs, and active and strong horses, trained to the sport, and capable of passing nimbly over the boggy soil and marshes. The swans are able to run as fast as a tolerably fleet horse. The greater number are caught by the dogs, which are taught to seize them by the neck; a mode of attack that causes them to lose their balance, and become an easy prey.

Notwithstanding their size, these birds are so extremely swift on the wing, when in full feather, as to make them more difficult to be shot than almost any others; it being frequently necessary to aim ten or twelve feet before their bills. This, however, is only when they are flying before the wind in a brisk gale; at which time they seldom proceed at the rate of less than a hundred miles an hour: but when flying across the wind or against it, they are not able to make any great progress.

The present species has severai marks of distinction from that called by us the Tame Swan: but the most remarkable one is the strange form of the windpipe; which falls into the chest, then turns back like a trumpet, and afterwards makes a second bend to join the lungs. By this curious construction the bird is enabled

to utter a loud and shrill note. The Tame Swan, on the contrary, is the most silent of all the feathered tribes ; it can do nothing more than hiss, which it does on receiving any provocation. The vocal swan emits its loud notes only when flying, or calling: the sound is *whoogh, whoogh*, very loud and shrill, but not disagreeable when heard high in the air and modulated by the winds. The Icelanders compare it to the notes of the violin: they hear it at the end of their long and gloomy winter, when the return of the Swans announces also the return of summer ; every note, therefore, must to them be melodious, which presages a speedy thaw, and a release from their tedious confinement.

It was from this species alone that the ancients derived their fable of the Swan's being endowed with the power of melody. Embracing the Pythagorean doctrine, they believed the bodies of these birds to be mansions of the souls of departed poets ; and then attributed to them the same faculty of harmony which the poets had possessed in a pre-existent state. And the vulgar, not distinguishing between sweetness of numbers and melody of voice, thought that real which was only intended figuratively. The Mute or Tame Swan never frequents the Padus: "and I am almost equally certain (says Mr. Pennant) that it never was seen on the Cayster in Lydia ; each of them, streams celebrated by the poets for the grand resort of Swans. The Padus was styled *Oloiferus*, from the numbers of these birds which frequented its waters ; and there are few of the poets, either Greek or Latin, who do not make them its inhabitants."

THE TAME OR MUTE SWAN*.

Nothing can exceed the beauty and elegance with

* SYNONYMS. *Anas Olor*. *Linnaeus*.—*Cygne*. *Buff.*—*Bcw.* *Birds*, vol. ii. p. 277.

which the Swan rows itself along in the water, throwing itself into the proudest attitudes imaginable before the spectators; and there is not perhaps in all nature a more lively or striking image of dignity and grace. In the exhibition of its form, we see no broken nor harsh lines, no constrained nor abrupt motions, but the roundest contour, and the easiest transitions imaginable: the eye wanders over every part with pleasure, and every part takes new grace with new postures.

The Swan, with arched neck
Between her white wings mantling, proudly rows
Her state with oary feet.

She exhibits, however, but an inelegant appearance on land.

This bird is able to swim faster than a man can walk. The Swan is very strong, and at times extremely fierce: and this bird has not unfrequently been known to throw down and trample upon youths of fifteen or sixteen years of age: and an old Swan, we are told, is able to break the leg of a man with a single stroke of its wing. A female, while in the act of sitting, observed a fox swimming towards her from the opposite shore: she instantly darted into the water, and having kept him at bay for a considerable time with her wings, at last succeeded in drowning him; after which, in the sight of several persons, she returned to her nest in triumph. This circumstance took place at Pensy in Buckinghamshire.

Swans are very long-lived, sometimes attaining the great age of a hundred years. The flesh of the old birds is hard and ill-tasted; but that of the young-ones, or cygnets, was formerly much esteemed. At present, cygnets are fattened near Norwich, but chiefly for the tables of the corporation of that place. Persons who have property on the river there, take the young birds and send them, for the purpose of being fed, to some one who is employed by the corporation; and for his trouble he is paid about half-a-guinea *per* bird.

Cygnets were a few years ago valued at a guinea each ; but when sold, they now bring much more. In the river Thames, Swans are very numerous. Here they are royal property, and it is accounted felony to steal their eggs. In the reign of Edward the Fourth, Swans were held in such estimation, that " no person who did not possess a freehold of the clear yearly value of five marks" was permitted to keep any.

At Abbotsbury in Dorsetshire, there was formerly a noble swannery, the property of the Earl of Ilchester, where six or seven hundred birds were kept ; but from the mansion having been almost deserted by the family, this collection has of late been much diminished. The royalty belonged anciently to the abbot, and, previously to the dissolution of monasteries, the Swans frequently amounted to more than double this number.

The Swan makes its nest of grass, among reeds ; and in February begins to lay, depositing an egg every other day till there are six or eight. These occupy six weeks in hatching. Dr. Latham says, he knew two females that for three or four years successively agreed to associate, and had each a brood yearly, bringing up together about eleven young-ones : they sate by turns, and never quarrelled. These birds are found wild in Russia and Siberia.

THE SNOW GOOSE *.

Snow Geese are very numerous about Hudson's Bay ; where they are migratory, going further north-

* DESCRIPTION. This bird is about the size of the common goose. The upper mandible of the bill is scarlet, and the lower one whitish. The general colour of the plumage is white ; except the first ten quills of the wings, which are black with white shafts. The young birds are of a blue colour, till they are a year old. The legs are red.

SYNONYMS. *Anas hyperborea* *Linnaeus*.—White Brant. *Lawson*.

ward to breed. They are also found in several of the northern parts of the Old Continent.

These birds have so little of the shyness of other Geese, that, about Jakut, and the other parts of Siberia which they frequent, they are caught in the most ridiculous manner imaginable. The inhabitants place near the banks of the rivers a great net in a straight line; or else form a hovel of skins sewed together. This done, one of the company dresses himself in the skin of a white rein-deer, advances towards the flock of Geese, and then turns back towards the net or hovel; and his companions go behind the flock, and, by making a noise, drive them forward. The simple birds mistake the man in white for their leader, and follow him within reach of the net; which is suddenly pulled down, and thus captures the whole. When he chooses to conduct them even into the hovel, they follow in a similar manner; he creeps in at a hole left for that purpose, and out at another on the opposite side, which he closes up. The Geese follow him through the first; and as soon as they are in, he passes round and secures every one of them. In that frozen climate the Snow Geese afford an essential means of subsistence to the natives; and their feathers are an article of commerce. Each family kill thousands in a season; and, after plucking and gutting them, they fling them in heaps, into holes dug for that purpose, and covered only with earth. The mould freezes, and forms over them an arch; and whenever the family have occasion to open one of these magazines, they find their provisions perfectly sweet and good.

THE WILD GOOSE*.

The fens of Lincolnshire, Cambridgeshire, and seve-

* SYNONYMS. *Anas Anser*. Linn.—Oye sauvage. Buff.—Gray Lag Goose. Pennant.—Fen Goose. Lister.—Tame Goose, var.—*Bew. Birds*. v. ii. p. 292—297.

ral other parts of England, abound in Wild Geese, which are supposed not to migrate in this country, as they do in some parts of the Continent. These birds are often seen in flocks of from fifty to a hundred, flying at very great heights, and seldom resting by day. Their cry is frequently heard while, from their distance above, they are imperceptible to the sight. Whether this be their note of mutual encouragement, or only the necessary consequence of respiration, seems doubtful; but they seldom exert it when they alight in their journeys. On the ground they always arrange themselves in a line, and seem to descend rather for rest than refreshment; for having continued there an hour or two, one of them with a long, loud note, sounds a kind of signal, to which the rest always punctually attend, and, rising in a group, they pursue their journey with alacrity. Their flight is conducted with vast regularity. They always proceed either in a line a-breast, or in two lines joining in an angle at the middle. In this order they often take the lead by turns, the foremost falling back in the rear when tired, and the next in station taking his place. Their track is generally so high, that it is almost impossible to reach them from a fowling-piece; and even when this can be done, they file so equally, that one discharge seldom kills more than a single bird.

They breed in the plains and marshes about Hudson's Bay in North America: in some years the young-ones are caught in considerable numbers; and at this age they are easily tamed. It is, however, singular, that they will never learn to eat corn, unless some of the old ones be caught along with them.

Our common tame Goose is no other than this species in a state of domestication.

These birds are kept in vast quantities in the fens of Lincolnshire; several persons there having as many as a thousand breeders. They are bred for the sake of their quills and feathers; for which they are stripped while alive, once in the year for the quills, and five

times for the feathers. The first plucking commences about Lady-day for both ; and the other four are between Lady-day and Michaelmas. It is said that, in general, the birds do not suffer much from this operation. The old Geese submit quietly to the operation ; but the young-ones are very noisy and unruly. Mr. Pennant says, he once saw this business performed, and observed that even Goslings of only six weeks old were not spared ; for their tails were plucked, as he was told, to inure them early to the custom. The possessors, except in this cruel practice, treat their birds with great kindness ; lodging them very often even in the same room with themselves.

These Geese breed in general only once a-year, but if well kept they sometimes hatch twice in a season. During their sitting, the birds have spaces allotted to each, in rows of wicker pens placed one above another ; and the *gozzard*, or *goose-herd*, who has the care of them, drives the whole flock to water twice a-day, and, bringing them back to their habitations, places every bird (without missing one) in its own nest.

It is scarcely credible what numbers of Geese are driven from the distant counties to London for sale, frequently two or three thousand in a drove ; and, in the year 1783, one drove passed through Chelmsford, in its way from Suffolk to London, that contained more than nine thousand.

However simple in appearance, or awkward in gesture, the Goose may be, it is not without many marks both of sentiment and understanding. The courage with which it protects its offspring and defends itself against ravenous birds, and certain instances of attachment and even of gratitude, which have been observed in it, render our general contempt of the Goose ill-founded. This I shall confirm by relating an instance of affection, which was communicated to M. de Buffon by a man of veracity and information. The following are nearly his own words :—“ There were two Ganders, a gray and a white one, (the latter named *Jacquot*,)

with three females. The males were perpetually contending for the company of these dames. When one or the other prevailed, it assumed the direction of them, and hindered its rival from approaching. He who was the master during the night, would not yield the next morning; and the two gallants fought so furiously, that it was necessary to be speedy in parting them. It happened one day, that being drawn to the bottom of the garden by their cries, I found them with their necks entwined, striking their wings with rapidity and astonishing force: the three females turned round, as wishing to separate them, but without effect: at last the white Gander was worsted, overthrown, and maltreated by the other. I parted them; happily for the white one, as he would otherwise have lost his life. Then the conqueror began screaming and gabbling, and clapping his wings; and ran to join his mistresses, giving each a noisy salute, to which the three dames replied, ranging themselves at the same time round him. Meanwhile poor Jacquot was in a pitiable condition; and, retiring, sadly vented at a distance his doleful cries. It was several days before he recovered from his dejection; during which time I had sometimes occasion to pass through the court where he strayed. I saw him always thrust out from society; and whenever I passed, he came gabbling to me. One day he approached so near, and showed so much friendship, that I could not help caressing him, by stroking with my hand his back and neck; to which he seemed so sensible, as to follow me into the entrance of the court. Next day, as I again passed, he ran to me, and I gave him the same caresses; with which alone he was not satisfied, but he seemed, by his gestures, to desire that I should introduce him to his mates. I accordingly led him to their quarter; and, upon his arrival, he began his vociferations, and directly addressed the three dames, who failed not to answer him. Immediately his late victor sprung upon Jacquot. I left them for a moment; the gray one was always the stronger: I took part with my Jacquot, who

who was under. I set him over his rival; he was thrown; I set him up again. In this way they fought eleven minutes; and, by the assistance which I gave him, he at last obtained the advantage, and got possession of the three dames. When my friend Jacquot saw himself the master, he would not venture to leave his females, and therefore no longer came to me when I passed: he only gave me at a distance many tokens of friendship, shouting and clapping his wings; but would not quit his companions, lest, perhaps, his rival should take possession. Things went on in this way till the breeding season, and he never gabbled to me but at a distance. When his females, however, began to sit, he left them, and redoubled his friendship to me. One day, having followed me as far as the icehouse at the top of the park, the spot where I must necessarily part with him in pursuing my path to a wood at half a league distance, I shut him in the park. He no sooner saw himself separated from me, than he vented strange cries. However, I went on my road; and had advanced about a third of the distance, when the noise of a heavy flight made me turn my head: I saw my Jacquot, only four paces from me. He followed me all the way, partly on foot, partly on wing; getting before me and stopping at the cross-paths to see which way I should take. Our journey lasted from ten o'clock in the morning till eight in the evening; and my companion followed me through all the windings of the wood, without seeming to be tired. After this he attended me everywhere, so as to become troublesome; for I was not able to go to any place without his tracing my steps, so that one day he even came to find me in the church. Another time, as he was passing by the rector's window, he heard me talking in the room; and, as he found the door open, he entered, climbed up stairs; and marching in, gave a loud exclamation of joy, to the no small affright of the family.

"I am sorry, in relating such interesting traits of my good and faithful friend Jacquot, when I reflect that it

was myself that first dissolved the pleasing connexion; but it was necessary for me to separate him from me by force. Poor Jacquot fancied himself as free in the best apartment as in his own: and after several accidents of this kind, he was shut up, and I saw him no more. His inquietude lasted above a year, and he died from vexation. He was become as dry as a bit of wood, as I am told, for I would not see him: and his death was concealed from me for more than two months after the event. Were I to recount all the friendly incidents between me and poor Jacquot, I should not for several days have done writing. He died in the third year of our friendship, aged seven years and two months."

THE BERNACLE GOOSE*.

Of all the marvellous productions which ignorance, ever credulous, has substituted for the simple and truly wonderful operations of nature, perhaps the most absurd is the assertion that this species of Goose grows in a kind of shell, called *Lepas anatifera*, (Goose-bearing shell) on certain trees on the coast of Scotland and the Orkneys, or on the rotten timbers of old ships.

Of the numerous writers who have mentioned and credited these circumstances, I shall give the accounts of three, who all speak positively upon the subject.

* DESCRIPTION. The usual weight of this bird is about five pounds. The bill is short and black, crossed with a flesh-coloured mark on each side. Part of the head, the chin, throat, the under parts of the body, and the upper tail-coverts are white; and the rest of the head and neck, and the beginning of the back, are black. The thighs are mottled. Round the knee the feathers are black; and the lower feathers of the back are the same, edged with white. The wing-coverts and scapulars are blue gray; the ends black, fringed with white at the tip. The rump, tail, and legs are black.

SYNONYMS. *Anas Erythropus*. Linn.—Bernacle. Buffon.—Bernacle, or Clakis. Willughby.—Bewick's *Birds*, vol. ii. p. 307.

One of these, Maier, who has written a treatise expressly on this bird, says, that it certainly originates from shells: and, what is still more wonderful, Maier asserts that, in the Orkneys, he opened an hundred of the *Goose-bearing* shells, and found in all of them the rudiments of the bird completely formed.

Our countryman, Gerard, is another writer on this subject: his account of this wonderful transformation, I shall insert in his own words, which have been often quoted:—"What our eyes have seen, and our hands have touched, we shall declare. There is a small island in Lancashire, called the *Pile of Foulders*, whercin are found broken pieces of old and bruised ships, some whereof have been cast thither by shipwrecks; also the trunks and bodies, with the branches of old and rotten trees, cast up there likewise; whereon is found a certain spume or froth, that in time breedeth unto certain shells, in shape like those of the muscle, but sharper pointed, and of a whitish colour, and the end whereof is fastened unto the inside of the shell, even as the fish of oysters and muscles are: and the other end is made fast unto the belly of a rude mass or lump, which in time cometh into the shape and form of a bird. When it is perfectly formed, the shell gapeth open, and the first thing that appeareth is the aforesaid lace or string; next cometh the legs of the bird hanging out; and, as the bird groweth greater, it openeth the shell by degrees, till at length it has all come forth, and hangeth only by the bill. In short space after it cometh to full maturity, and falleth into the sea, where it gathereth feathers, and groweth to a fowle, bigger than a mallard, and lesser than a goose, having black legs, and bill or beake, and feathers black and white, spotted in such manner as our magpie, called in some places *pie-annes*, which the people of Lancashire call by no other name, than *Tree-goose*; which place aforesaid, and all those places adjoining, do so much abound therewith, that one of the best is bought for threepence. For the truth hereof, if

any doubt, may it please them to repair to me, and I will satisfy them by the testimonies of good witnesses."

The following is Sir Robert Murray's account of the Bernacle, inserted in the Philosophical Transactions:—

"In the western islands of Scotland, the west ocean throws upon their shores great quantities of very large weather-beaten timber; the most ordinary trees are fir and ash. Being in the island of East, I saw lying upon the shore, a cut of a large fir-tree, of about two feet and a half in diameter, and nine or ten feet long, which had lain so long out of the water, that it was very dry: and most of the shells that had formerly covered it were worn or rubbed off. Only on the parts that lay next the ground, there still hung multitudes of little shells: they were of the colour and consistence of muscle-shells. This *Barnacle-shell* is thin about the edges, and about half as thick as broad. Every one of the shells hath some cross-seams or sutures, which, as I remember, divide it into five parts.

"These parts are fastened one to another, with such a film as muscle-shells have.

"These shells are hung at the tree by a neck, longer than the shell, of a kind of filmy substance, round and hollow, and creased not unlike the wind-pipe of a chicken, spreading out broadest where it is fastened to the tree, from which it seems to draw and convey the matter which serves for the growth and vegetation of the shell, and little bird within it.

"In every shell that I opened I found a *perfect Sea-fowl*: the little bill, like that of a goose, the eyes marked; the head, neck, breast, wing, tails, and feet, formed; the *feathers* every where perfectly shaped, and blackish coloured; and the feet like those of other water-fowl, to my best remembrance."

Few subjects seem to have been more circumstantially related, or to rest on better evidence than the above: so natural to man is credulity, which passes all bounds; where the prodigy of an event takes firm hold of the imagination, and lays the

understanding asleep. Such are part of the wild chimeras that have been retailed concerning the origin of the Bernacles; and as these fables had once great celebrity, I have been induced to relate them here, only to show how contagious the errors of science are, and how prone men are to the fascinations of the marvellous.

In winter, Bernacle Geese are not uncommon on many of the northern and western coasts of Great Britain; but they are scarce in the south, and are there seldom seen except in inclement seasons. They leave our island in February, and retire northward to breed.

THE CANADA GOOSE*.

Canada Geese inhabit the more distant parts of North America. Immense flocks of these birds appear annually in the spring in Hudson's Bay: they pass further north to breed; and return southward in the autumn. The English at Hudson's Bay depend greatly on Geese, of this and other kinds, for their support; and in favourable years they often kill three or four thousand, which they salt and barrel. The arrival of the birds is impatiently waited, because they are considered the harbingers of the spring, and the month in which they return is named by the Indians the *Goose Moon*.

The English settlers send out their servants, as well as the Indians, to shoot these birds on their passage. The men for this purpose form of boughs a row of huts, at musket-shot distance from each other, and in a line across the vast marshes of the country. Each hovel, or

* **DESCRIPTION.** This is a bird somewhat bigger than the tame goose. The bill, the head, and the neck, are black; and under the throat there is a broad white band, like a crescent. The breast, the upper part of the belly, the back, and wing-coverts, are dusky brown; the lower parts of the neck and belly, and upper tail-coverts, white. The quills and tail are black, and the legs dark lead-colour.

SYNONYMS. *Anas Canadensis.* *Linnaeus.*—Oye à Cravate. *Buffon.*

stand, as it is called, is occupied by a single person. The men anxiously watch the flight of the birds; and at their approach they mimic their cackling so well, that the Geese will answer, wheel, and come nearer to the stand. The sportsman remains motionless, and on his knees, with his gun cocked the whole time; and does not fire till he can perceive the eyes of the Goose. He fires as they are going from him; then picks up another gun that lies by him, and discharges that also. The Geese that he has killed, he sets up on sticks, as if alive, to decoy others: he also makes artificial birds for the same purpose. In a good day (for they fly in very uncertain and unequal numbers) a single Indian will kill two hundred of these birds.

In Iceland, the Eider Ducks generally form their nests on small islands not far from the shore; and sometimes even near the dwellings of the natives, who treat them with so much attention and kindness, as to render them nearly tame. Sometimes two females will lay their eggs in the same nest, in which case they always agree remarkably well.

* **DESCRIPTION.** This species is about twice the size of the common duck. Its bill is black, and the feathers of the forehead and cheeks advance far into the base. In the male, the feathers of part of the head, of the lower part of the breast, the belly, and the tail, are black, as are also the quill-feathers of the wings; and nearly all the rest of the body is white. The legs are green. The female is of a reddish brown colour, variously marked with black and dusky streaks. The Eider Duck is principally found in the western isles of Scotland, and on the coasts of Norway, Iceland, and Greenland.

SYNONYMS. *Anas mollissima.* *Linn.*—Oye à Duvet, ou Eider. *Buff.*—Eider, or Cuthbert Duck. *Willughby.*—Great black and white Duck. *Edwards.*—Colk. *Martin.*—Duntur Goose. *Sibbald.*—*Penn. Brit. Zool.* ii. tab. 95.—*Bew. Birds,* ii. p. 314,

As long as the female is sitting, the male continues on watch near the shore; but as soon as the young-ones are hatched he leaves them. The mother, however, remains with them a considerable time afterwards. It is curious to observe her manner of leading them out of the nest, almost as soon as they creep from the eggs. Going before them to the shore, they trip after: and, when she comes to the water-side, she takes them on her back, and swims a few yards with them; when she dives, and the young ones are left floating on the surface, and are obliged to take care of themselves. They are seldom seen afterwards on land.

From these birds is produced the soft down so well known by the name of *eider*, or *edder-down*. This the old birds pluck from their breasts in the breeding season, to line their nests; making with it a soft bed for their young-ones. When the bird-catchers come to the nest, they carefully remove the female, and take away the superfluous down and eggs; after this they replace her. She then begins to lay afresh, and covers her eggs with new down, which she plucks from her body. When she has no more left, the male comes to her assistance, and covers the eggs with his down, which is white, and easily distinguished from that of the female. When the young-ones leave the nest, which is about an hour after they are hatched, it is once more plundered.

The best down and the most eggs, are obtained during the first three weeks after the nest is formed; and it has generally been observed, that the birds lay the greatest number of eggs in rainy weather. One female, during the time of laying, generally yields half a pound of down; which, however, is reduced one-half after it is cleansed.

The eider-down, when pure, is of such value that it is sold in Lapland for two-dollars a pound. It is extremely soft and warm; and so light and expansive, that a couple of handfuls squeezed together, are sufficient to fill a down quilt; a covering like a feather-bed,

used in cold countries instead of a common quilt or blanket.

There are generally exported from Iceland, every year, by the Iceland Company at Copenhagen, 1500 or 2000 pounds weight of down, cleansed and uncleansed, exclusively of what is privately exported by foreigners. In the year 1750, this company sold so much in quantity of this article, as produced 3747 rix-dollars, besides what was sent directly to Gluckstadt.

The Greenlanders kill these birds with darts; pursuing them in their little boats, watching their course by the air-bubbles when they dive, and always striking at them when they rise wearied to the surface. The flesh is valued as food, and their skins are made into warm and comfortable under-garments.

THE COMMON WILD DUCK*.

Wild Ducks frequent marshy places in many parts of this kingdom; but no where in such abundance as in Lincolnshire, where prodigious numbers of them are annually taken in the decoys. In only ten decoys in the neighbourhood of Wainfleet, as many as thirty-one thousand two hundred have been caught in one season.

A decoy is a pond generally situated in a marsh, so as to be surrounded with wood or reeds, and, if possible, with both, for the purpose of preventing the birds which frequent it from being disturbed. In this pond the birds sleep during the day; and, as soon as the evening sets in, the decoy *rises*, (as it is termed,) and the wild-fowl feed during the night. If the evening be still, the noise of their wings during flight is heard at a great distance, and is a pleasing though somewhat melancholy sound. *The decoy-ducks* (which are either bred in the

* SYNONYMS. *Anas Boschas*. *Linnaeus*.—Canard Sauvage. *Buffon*.—Common Wild Duck and Mallard. Common Tame Duck. *Willughby*.—*Penn. Brit. Zool.* ii. tab. 97.—*Bewick's Birds*, ii. p. 327, 333.

pond-yard, or in the marshes adjacent; and which, although they fly abroad, regularly return for food to the pond, and mix with the tame ones that never quit the pond) are fed with hemp-seed, oats, and buck-wheat. In catching the wild birds, hemp-seed is thrown over the skreens to allure them forward into the *pipes*; of which there are several, leading up a narrow ditch, that closes at last with a *funnel-net*. Over these *pipes*, which grow narrower from the first entrance, there is a continued arch of netting suspended on hoops. It is necessary to have a *pipe* for almost every wind that can blow, as on that circumstance it depends which *pipe* the fowl will take to. The decoy-man likewise always keeps to the leeward of the wild-fowl, and burns in his mouth or hand a piece of *Dutch turf*, that his effluvia may not reach them: for, if they once discover by the smell that a man is near, they all instantly take flight. Along each *pipe* are placed *reed skreens*, at certain intervals, to prevent him from being seen till he thinks proper to show himself, or the birds have passed up the *pipe*, to which they are led by the trained Ducks, (which know the man's whistle,) or enticed by the hemp-seed. A dog is sometimes used, who is taught to play backward and forward between the skreens, at the direction of his master. The fowl, roused by this new object, advance towards it, while the dog is playing still nearer the entrance of the *pipes*; till at last the decoy-man appears from behind the skreens, and the wild-fowl not daring to pass by him, and unable to fly off on account of the net covering the hoops, press forward to the end of the funnel-net, which terminates upon the land, where a person is stationed ready to take them. The trained birds return back past the decoy-men, into the pond, till a repetition of their services is required. The general season for catching Wild Ducks, is from the latter end of October till February. There is a prohibition, by act of parliament, against taking them between the first of June and the first of October.

It was formerly customary to have, in the fens, an

annual *driving* of the young Ducks, before they took wing. Numbers of people assembled, who beat a vast tract, and forced the birds into a net placed at the spot where the sport was to terminate. By this practice, (which, however, has been abolished by the legislature,) as many as a hundred and seventy-four dozen have been known to be taken in one day.

Wild Ducks are very artful birds. They do not always build their nests close to the water, but often at a considerable distance from it; in which case the female will take the young-ones in her beak, or between her legs, to the water. They have sometimes been known to lay their eggs in a high tree, in a deserted magpie or crow's nest; and an instance has been recorded of one being found at Etchingham, in Sussex, sitting upon nine eggs, in an oak, at the height of twenty-five feet from the ground: the eggs were supported by some small twigs laid crossways.

We are informed, that at Bold, in Lancashire, there formerly were great numbers of Wild Ducks, during the summer-time, in the ponds and moat near the Hall. These, it is said, used to be regularly fed. A man beat with a stone on a hollow wooden vessel, and immediately the Ducks would come round him. He scattered among them corn, which they gathered with as much quietness and familiarity as might have been expected from tame Ducks. As soon as they had finished their repast, they returned to their accustomed haunts.

Prodigious numbers of these birds are taken by decoys, near Picardy in France, particularly on the river Somme. It is customary there, to wait for the flock's passing over certain known places: when the sportsman having ready a wicker cage containing a number of tame birds, lets out one at a time, which enticing the passengers within gun-shot, five or six are often killed at once by an expert marksman. They are now and then also caught by means of hooks baited with

raw meat, which the birds swallow while swimming on the water.

Other methods of catching Ducks and Geese are peculiar to certain nations: one of these, from its singularity, seems worth mentioning. A person wades into the water up to the chin; and, having his head covered with an empty *calabash*, approaches the place where the Ducks are. These, not regarding an object of this kind, suffer the man freely to mix with the flock; and he has only to pull them by the legs under the water, one after another, and fix them to his belt, till he is satisfied. This curious method is frequently practised on the river Ganges, the earthen vessels of the Gentoos being there used instead of calabashes. These vessels are what the Gentoos boil their rice in: after having been once used, they are considered as defiled, and are thrown into the river as useless. The duck-takers find them convenient for their purpose; as the Ducks, from seeing them constantly float down the stream, consider them as objects not to be regarded.

The Chinese make great use of Ducks, but prefer as food the tame to the wild ones. It is said that the major part of the Ducks in China are hatched by artificial heat. The eggs, being laid in boxes of sand, are placed on a brick hearth, to which is given a proper heat during the time required for hatching. The Ducklings are fed with craw-fish and crabs, boiled and cut small, and afterwards mixed with boiled rice: and in about a fortnight they are able to shift for themselves. The Chinese then provide them an old *step-mother*, who leads them where they are to find provender; being first put on board a *sampane*, or boat, which is destined for their habitation; and from which the whole flock, often to the amount of three or four hundred, go out to feed, and return at command. This method is used nine months out of the twelve, (for in the colder months it does not succeed,) and it is so far from a novelty, that it may every where be seen, but

more especially about the time of cutting the rice, and gleaning the crop; when the masters of the Duck-sampanes row up and down the river, according to the opportunity of procuring food, which is found in plenty, at the tide of ebb, on the rice plantations, as they are overflowed at high water. It is curious to observe how the Ducks obey their masters; for some thousands, belonging to different boats, will feed on the same spot, and, on a signal given, will follow their leader to their respective sampans, without a single stranger being found among them. This is still more extraordinary, if we consider the number of inhabited sampans* on the Tigris: there are supposed to be no fewer than *forty thousand*; they are moored in rows close to each other, with here and there a narrow passage for boats to sail up and down the river. The Tigris in Canton is somewhat wider than the Thames at London-bridge; and the whole river is there covered in this manner, for the extent of at least a mile.

THE GARGANEY †.

A couple of these birds were for more than two months in the possession of M. Frisch, who has given

* Sampane is a common name for a boat: the inhabited sampans contain each a separate family, of which they are the only dwelling; and many the Chinese pass almost their whole lives in this manner on the water.

† DESCRIPTION. This bird is somewhat larger than the teal. The bill is black. The crown and hind part of the head are of a dusky brown. On the chin there is a large black spot; and, from the eye, a white streak passes to the back of the head. The cheeks and neck are of a pale purple and white. The breast is light brown, crossed with semi-circular bars of black; and the belly is white, having its lower parts varied with dusky specks. The legs are lead-coloured.

SYNONYMS. *Anas Querquedula*. Linn.—Sarcelle. Buff.—Pied Widgeon. Summer Teal. Montague.—Penn. Brit. Zool. ii. tab. 101.

the following detail of their mode of living in this sort of incipient domestication. "I presented to them (he says) different seeds, and they would touch none; but scarcely had I set beside their water-trough, a basin filled with millet, than they both ran to it. At every bill-full which they took, each went to the water, and they carried as much water as, in a short time, completely to soak the millet; yet the grain was not moistened sufficiently to their mind, and I saw them busied in carrying millet and water to the ground of their pen, which was of clay, and when the bottom was softened and tempered enough, they began to dabble, and made a cavity, in which they ate their millet, mixed with earth. I put them into a room, and they carried in the same way, though to little purpose, the millet and water to the deal floor. I led them on the grass, and they seemed to do nothing but dig for seeds, without eating the blades, or even the earth-worms. They pursued flies, and snapped at them like ducks. When I delayed to give them their accustomed food, they called for it with a feeble hoarse cry, *quoak*, repeated every minute. In the evening they lay in the corners; and even during the day, when any person went near them, they hid themselves in the narrowest holes. They lived thus till the approach of winter, but when the severe cold set in, they both died suddenly."

OF THE AUK TRIBE IN GENERAL*.

The Auks are, for the most part, inhabitants of the Northern Ocean. They breed in holes, which they sometimes dig in the earth, or in the fissures of rocks;

* The bills of these birds are thick, convex, and, except in very few species, are compressed at the sides, and crossed with transverse furrows. The nostrils are linear, and situated parallel to the edge of the bill. The Auks have three toes, all placed forward.

and lay but one egg. They generally rest in these holes during the night. Their feet are placed behind the centre of gravity, which makes some of the species stand with their heads almost upright.

The Puffin Auks appear in some parts of our coast about the beginning of April. Their first employment is the forming of burrows for their young ones, in the earth or sand. This is the task of the males, who are so intent on the business, as to suffer themselves at that time to be taken with the hand. Some, where there is opportunity, save themselves the trouble of forming holes, by dispossessing rabbits of theirs.

The females lay one white egg each; and the males as well as females perform the office of sitting, relieving each other when they go to feed. The young-ones are hatched in the beginning of July. Mr. Pennant has asserted, that the affection of these birds for their young is so great, that, when "laid hold of by the wings, they will give themselves the most cruel bites on any part of their body that they can reach, as if actuated by despair: and that, when released, instead of flying away, they will often hurry again into their burrows." When I was in Wales, in the summer of 1801,

* DESCRIPTION. This bird is about twelve inches in length. The bill is an inch and a quarter long, much compressed at the sides; and nearly an inch and a half deep at the base, whence both mandibles tend to a point, which is a little curved: across these there are oblique furrows: the half of the bill next to the point is red; and that next to the base blue-gray. The top of the head, the hind part of the neck, and all the upper parts of the plumage, are black; which colour passes also round the throat like a collar. The sides of the head, the chin, and all the under parts are white. The legs are orange.

SYNONYMS. *Alca Arctica*. Linn.—Macareux. Buff.—Puffin. Penn.—Coulterneb. Willughby.—Bowger. Martin.—*Bew. Birds*, i. p. 168.

I took several Puffins out of the holes that had young-ones in them, for the purpose of ascertaining this fact. They ~~bit me~~, with great violence, but none of them seized on any parts of their own body: a few on being released ran into the burrows; but not always into those from which I had taken them. If it was more easy for them to escape into a hole than raise themselves into the air, they did so; but if not, they ran down the slope of the hill in which their burrows were formed, and flew away. The noise they make when with their young, is a singular kind of humming, much resembling that produced by the large wheels used for the spinning of worsted. On being seized, they emitted this noise with greater violence; and from its being interrupted by their struggling to escape, it sounded not much unlike the efforts of a dumb man to speak.

The young-ones are entirely covered with a long blackish down; and, in shape, are altogether so different from the parent birds, that no one would at first sight suppose them of the same species. Their bill also is long, pointed, and black, with scarcely any marks of furrows.

The re-migration of the Puffins takes place about the middle of August; when not a single one remains behind, except the unfledged young of the latter hatches. These are left a prey to the peregrine falcon; which watches the mouth of the holes for their appearance, compelled, as they must soon be, by hunger, to come out.

The food of these birds is sprats or sea-weeds, which makes them excessively rank; yet the young-ones are pickled and preserved with spices, and by some people are much admired.

The Kamtschadales and Kuriles wear the bills of Puffins fastened about their necks with straps. The priests put them on with certain ceremonies, and the persons are supposed to be always attended with good fortune, so long as they retain them there.

It appears certain, that Puffins do not breed till their

third year. The proof of this arises from observations made by the Rev. Hugh Davies, of Aber, in Caernarvonshire, on the different forms of the bill among some thousands of this species, which, in the year 1776, were wrecked on the Welsh coast, near Criccieth. He saw the beach for miles, covered with dead birds; among which were Puffins, razor-bills, guillemots, and kittiwakes; as well as tarrocks, gannets, wild geese, bernacles, brent geese, scoters, and tufted ducks. This unusual accident he conjectured to be owing to a severe storm of frost that had overtaken both the migrants and re-migrants. From the Puffins he here found, he remarked the different forms of their bills in their several periods of life. Those that he supposes to have been of the first year, were small, weak, destitute of any furrow, and of a dusky colour; those of the second year were considerably stronger and larger, lighter-coloured, and with a faint rudiment of a furrow at the base; those of the more advanced years had vivid colours, and were of great strength.

THE PERROQUET AUK*.

This species of Auk is found in flocks in Kamtschatka, in the isles towards Japan, and on the western shores of America. In the nights they harbour in the crevices of rocks. Like most of the tribe, they are

* DESCRIPTION. This bird is about the size of a blackbird. The bill is much compressed, and convex both above and beneath. The nostrils are placed in the middle of it, and pervious, and above these there is a furrow that reaches from the base to the middle. The colour of the bill is deep red. From the hinder part of the eye springs a slender tuft of white feathers, which hangs loosely on the neck. The upper parts of the plumage, and the neck, are black; and the under parts, from the breast, white. The wings are short. The legs are of a dirty yellow, and the webs of the feet brown.

SYNONYMS. *Alca Psitticula*. Latham.—Le Pingouin Perroquet. *Sonnini's edit. of Buffon*.

indolent and stupid birds, as the following extraordinary method of catching them sufficiently proves: One of the natives places himself in the evening among the rocks, under a loose garment of fur, of a particular shape, with large open sleeves, when the birds, returning to their lodging-places at dusk, run under the skirts and up the arm-holes, in order to shelter themselves during the night; the man concealed beneath, kills them as fast as they enter, and, by this means, as many are often taken in one evening as he can carry away. Their stupidity likewise occasions them very often to fly on board ships at such times, mistaking these for roosting places: by which navigators have sometimes been taught to avoid the danger of approaching too near the land, either in the evenings, or on the approach of storms.

OF THE PENGUINS IN GENERAL*.

The Penguins seem to hold the same place in the southern parts of the world, that the auk do in the northern. They resemble these birds in almost all their habits: they walk erect, and are very stupid. They also resemble them in their colour, and in their mode of feeding, and of making their nests. From the extreme shortness of their wings, they are altogether incapable of flying. They swim with great swiftness; and are fortified against the effects of a long

* Their bill is strong, straight, furrowed at the sides, and bent towards the point. The nostrils are linear, and placed in the furrows. The tongue is covered with strong spines, pointing backward. The wings are small, not unlike fins, and are covered with feathers no longer than those of the rest of the body. The body is clothed with thick, short feathers; which have broad shafts, and are placed almost as compactly as scales. The legs are short and thick, situated backwards, near the tail. The toes are four, all placed forward; the interior ones are loose, and the rest webbed. The tail is very stiff, consisting of broad shafts scarcely webbed.

continuance in the cold water, by an abundance of fat. They hatch their young-ones in an erect position; and cackle like geese, but in a hoarser tone.

THE CRESTED PENGUIN¹

The Crested Penguins are inhabitants of several of the South Sea islands. They have the names of Hopping Penguins, and Jumping Jacks, from their action of leaping quite out of the water, sometimes to the height of three or four feet, on meeting with any obstacle in their course. All the Penguins, while swimming, sink above the breast, the head and neck only appearing out of the water; and they row themselves along with their finny wings as with oars.

This species have a greater air of liveliness in their countenance than almost any of the others: yet they are very stupid birds, and so regardless of their own safety, as even to suffer any person to lay hold of them. When provoked, they erect their crest in a very beautiful manner; and we are told, that, when attacked by our voyagers, they ran at them in flocks, pecked their legs, and spoiled their clothes. "When the whole herd was beset, (says Mr. Forster, in his account of one of the South Sea islands,) they all became very

See Plate v. Fig. 4.

DESCRIPTION. This beautiful bird is nearly two feet in length. The bill is red, and three inches long; the upper mandible curved at the end, and the lower obtuse. The head, neck, back, and sides, are black. Over each eye there is a stripe of pale yellow feathers, which lengthens behind into a crest about four inches long; this is decumbent, but can be erected at pleasure: the feathers of the head above this are longer than the rest, and stand upward. The wings are black on the outside; but the edges and the inside are white. The legs are orange-coloured, and the claws dusky. The female is destitute of crest.

SYNONYMS. *Aptenodytes Chrysocome.* Linn.—*Manchot Sauter.* Buffon.

bold at once; and ran violently at us, biting our legs, or any part of our clothes."

Their sleep is extremely sound; for Dr. Sparrman, accidentally stumbling over one of them, kicked it several yards without disturbing its rest; nor was it until after being repeatedly shaken, that the bird awoke. They are very tenacious of life. Mr. Forster left a great number of them, apparently lifeless from the blows they had received, while he went in pursuit of others; but they all afterwards got up and marched off with the utmost gravity.

These birds form their nests among those of the pelecans, and live in tolerable harmony with them. The female generally lays only a single egg. Their nests are holes in the earth; which they easily form by means of their bills, throwing back the dirt with their feet. They are often found in great numbers on the shores where they have been bred.

Penrose mentions a species of Penguin that resorts to certain parts of the Falkland Islands in incredible numbers, and lays its eggs. These places, he tells us, by the long residence of the birds, had become entirely freed from grass; and he has given to them the name of *towns*. The nests were composed of mud, raised into hillocks, about a foot high, and placed close to each other. "Here, (he says,) during the breeding season, we were presented with a sight that conveyed a most dreary, and, I may say, most awful idea of the desertion of the islands by the human species: a general stillness prevailed in these towns: and whenever we took our walks among them, in order to provide ourselves with eggs, we were regarded, indeed, with side-long glances, but we carried no terror with us.

"The eggs are rather larger than those of a goose, and are laid in pairs. When we took them once, and sometimes twice in a season, they were as often replaced by the birds; but prudence would not permit us to plunder too far, lest a future supply in the next year's brood might be prevented."

OF THE PETREL TRIBE IN GENERAL

These birds frequent only the ocean, and are seldom to be seen on shore, except during the breeding season. Their legs are bare of feathers a little above the knee. They have the singular faculty of spouting from their bills, to a considerable distance, a large quantity of pure oil; which they do, by way of defence, into the face of any one that attempts to annoy them. This oil has been frequently used in medicine, and, some writers say, with success.

THE STORMY PETREL†, AND NORFOLK ISLAND PETREL‡.

Ranging over the expanse of the ocean, and frequently at a vast distance from land, the former of

* The bill is somewhat compressed; the mandibles are equal in length, and the upper one is hooked at the point. The nostrils form a kind of truncated cylinder, lying over the base of the bill. The feet are webbed, and, in the place of a hind toe, have a spur pointing downwards.

† DESCRIPTION. The Stormy Petrel is not larger than a swallow; and its colour is entirely black, except the coverts of the tail, the tail itself, and the vent-feathers, which are white. Its legs are long and slender.

SYNONYMS. *Procellaria pelagica*. Linn.—Oiseau de Tempête. Buffon.—Petrel. Dampier.—Storm Finch, or Little Petrel. Small Petrel. Edwards.—Penn. Brit. Zool. vol. ii. tab. 91.

‡ DESCRIPTION. The length of the Norfolk Island Petrel is about sixteen inches. The bill is about an inch and a half long, black, and much hooked at the end. The head as far as the eyes, and the chin, are mottled in waves of brown and white: the rest of the body is of a sooty brown above, and a deep ash-colour beneath. The wings, when closed, exceed the tail by an inch. The legs are of a pale yellow, and part of the toes and webs is black.

SYNONYMS. *Procellaria Alba*. Linnæus.—White-breasted Petrel. Latham.

these birds is enabled to brave the utmost fury of the storms. Even in the most tempestuous weather it is frequently observed by the mariners, ~~skimming~~ with almost incredible velocity, along the hollows of the waves, and sometimes over their summits. It often follows vessels, in great flocks, to pick up any thing that is thrown overboard; but its appearance is always looked upon by the sailors as the sure presage of stormy weather in the course of a few hours after. It seems to seek for protection from the fury of the wind in the wake of the vessels; and from the same reason it very probably is, that it often flies along between two surges.

The nests of these birds are found in the Orkney Islands, under loose stones, in the months of June and July. The Stormy Petrels live chiefly on small fish, and, although mute by day, are very clamorous during the night.

The inhabitants of the Feroe Islands are said to draw a wick through the bird, which, being lighted at one end, serves for a candle, the flame being fed by the fat and oil of the body.

The other species of Petrel here mentioned are found in great numbers in Norfolk Island, where they burrow in the sand like rabbits. On Mount Pit, the highest land in the island, the ground was as full of holes as a rabbit-warren, and an immense number of aquatic birds burrowed and built their nests in them. These, during the day, were at sea; but as night approached they returned in vast flocks. The settlers lighted small fires every night on this mount, around which the birds dropped, as fast as the people could pick them up and kill them; for the wings of many sea-birds are so long as to prevent their rising till they can ascend some small elevation. Hunter says that 18,000 birds of different species were killed in the space of about six weeks.

OF THE ALBATROSS TRIBE.

There are but four species of Albatross; of which three are found principally in the seas of hot climates, and the fourth is confined to those within the Antarctic Circle. Their bill is straight: the upper mandible hooked at the point; and the lower truncated, or appearing as if cut off. The nostrils are oval, wide, prominent, and lateral; the tongue is very small; and the feet have each three toes, all placed forward.

THE WANDERING ALBATROSS, OR MAN-OF-WAR BIRD

These birds are found in most seas, but chiefly in those within the Tropics: they are, however, often seen about the Cape of Good Hope; and, towards the end of July, they collect in great numbers in Kamtschatka, and the seas which separate that part of Asia from America.

They are exceedingly voracious, and feed on various species of fish and molluscæ. The shoals of flying-fish, when persecuted by their enemies of the deep, make their appearance for a short flight in the air, and suffer greatly from the voracity of these birds. They also often pursue the shoals of salmon into the mouths of large rivers; and so gorge themselves as, notwithstanding their otherwise extraordinary powers of flight, to be prevented by their weight and consequent stupidity even from rising.

In the West Indies the appearance of these birds is

* **DESCRIPTION.** In size these birds are sometimes as large as a swan. Their general colour is white, the upper parts are marked with black lines. The quill-feathers are black; and the tail is rounded, and of a lead colour. The bill is of a pale yellow, and the legs are flesh-coloured.

SYNONYMS. *Diomedea exulans.* *Linnaeus.*—Albatross. *Buffon*—Wandering Albatross. *Latham.*—Man-of-war Bird. *Albin.*

said to foretel the arrival of ships; this indeed is sometimes true, and arises from a very natural cause. They always fish in fine weather; so that when the wind is boisterous out at sea, they retire into the harbours, where they are protected by the land; and the same wind that blows them in, oftentimes brings also vessels to seek a retreat from the storm.

Their voice very much resembles the braying of an ass. In South America they build their nests about the end of September: these are formed of earth, on the ground, and are from one to three feet high. The eggs are as large as those of a goose, and have the singular property of their white not becoming hard by boiling. When attempted to be seized, these birds make a vigorous defence with their bills.

Many of the Indians set a high value on the feathers of these birds; which they use for arrows, as they last much longer than those of any other birds. The natives of the South Sea Islands watch the arrival of the Man-of-war Birds at the rainy season; and, when they observe them, they launch from their canoes into the water a light float of wood, baited with a small fish. When one of the Birds approaches it, a man stands ready with a pole, about eighteen feet in length; and on its pouncing, he strikes at the bird, and seldom fails of bringing it down. If, however, he miss his aim, he must wait for some other bird; for that will no more be tempted to approach. The cock birds are reckoned the most valuable; and sometimes even a large hog is given in exchange for one of these.

The inhabitants of Kamtschatka make buoys to their nets, of the intestines of the Man-of-war Birds, which they blow up like bladders. They also make tobacco-pipes and needle-cases, of the bones of the wings; and use them likewise for heckling the grass, which serves them instead of flax. The flesh is very hard and dry.

OF THE PELECAN TRIBE IN GENERAL*.

The Peleicans are gregarious; and, in general, remarkable for their extreme voracity. They are very expert in seizing fish with their long and apparently unwieldy bills; and many of the species are rendered of use to mankind, by being trained to fishing. In general, they keep out far at sea; but some of them are found occasionally in the interior parts of continents.

THE WHITE OR GREAT PELECAN†.

The bag in the lower mandible of the bill of this bird, is one of the most remarkable members that is found in the structure of any animal. Though it wrinkles up nearly into the hollow of the chap, and the sides to which it is attached, are not (in a quiescent state) above an inch asunder, it may be extended to an amazing capacity; and when the bird has fished with

* In this tribe the bill is long and straight: and the end either hooked, or sloping. The nostrils are placed in a furrow that runs along the sides of the bill, and, in most of the species, they are scarcely perceptible. The face, except in two species, is destitute of feathers. The gullet is naked, and capable of great extension. The number of toes is four, and these are all webbed together.

† See Plate xiii. Fig. 9.

DESCRIPTION. This Pelecan, when full grown, is larger than a swan. The bill is about sixteen inches long; and the skin between the sides of the lower mandible is very flaccid and dilatable, extending eight or nine inches down the neck. This skin is bare of feathers, and is capable of containing many quarts of water. The tongue is so small as scarcely to be distinguishable. The sides of the head are naked; and on the back of the head there is a kind of crest. The whole plumage is whitish, suffused with a pale blush colour; except some parts of the wings, which are black. The legs are lead-coloured, and the claws gray.

SYNONYMS. *Pelecanus Onocrotalus*. Linn.—Pelican. Buff.—Great White Pelecan. Latham.

success, its size is almost incredible. It will contain a man's head with the greatest ease; and, it has been said, that even a man's leg, with a boot on, has been hidden in one of these pouches. In fishing, the Pelecan fills this bag, and does not immediately swallow his prey; but, when the bag is full, he returns to the shore to devour at leisure the fruits of his industry. He is not long in digesting his food; for he has generally to fish more than once in the course of a day.

At night, when the toils of the day are over, these birds, which are lazy and indolent when they have glutted themselves with fish, retire a little way on the shore to take their rest for the night. Their attitude in that state is with their head resting against the breast. They remain almost motionless till hunger calls them to break off their repose: thus they pass nearly the whole of their life in eating and sleeping. When thus incited to exertion, they fly from the spot, and, raising themselves thirty or forty feet above the surface of the sea, turn their head with one eye downward, and continue to fly in that position till they see a fish sufficiently near the surface. They then dart down with astonishing swiftness, seize it with unerring certainty, and store it in their pouch. Having done this, they rise again, and continue the same actions till they have procured a competent stock.

Whence it was that the ancients attributed to this stupid bird the admirable qualities and parental affections for which it was celebrated amongst them, I am unable to imagine; unless, struck with its extraordinary figure, they were desirous of supplying it with propensities equally extraordinary. For, in truth, the Pelecan is one of the most heavy, sluggish, and voracious, of all the feathered tribes; and is but ill fitted to take those vast flights, or to make those cautious provisions, which have been mentioned.

It is, however, by no means destitute of natural affection, either towards its young-ones, or towards others of its own species. Clavigero, in his History

of Mexico, says, that sometimes the Americans, in order to procure, without trouble, a supply of fish, cruelly break the wing of a live Pelecan, and, after tying the bird to a tree, conceal themselves near the place. The screams of the miserable bird attract other Peleicans to the place, which, he assures us, eject a portion of the provisions from their pouches, for their imprisoned companion. As soon as the men observe this, they rush to the spot, and, after leaving a small quantity for the bird, carry off the remainder.

The female feeds her young-ones with fish macerated for some time in her bag. Labat informs us, that he caught two Peleicans, when very young, and tied them by the leg to a post stuck into the ground; and he had the pleasure of seeing one of the old ones come for several days to feed them, remaining with them the greatest part of the day, and passing the night on the branch of a tree that hung over them. By this means they all three became so familiar as to suffer themselves to be handled; and the young-ones always took the fish that he offered to them, storing it first in their bag, and then swallowing it at leisure.

The Pelecan has often been rendered domestic; and this writer assures us, that he saw one among the Americans so well trained, that it would, at command, go off in the morning, and return before night, having its pouch distended with prey; part of which it was made to disgorge, and the rest it was permitted to retain for its trouble.

According to the account of Faber, a Pelecan was kept in the court of the Duke of Bavaria above forty years. He says that it seemed fond of being in the company of mankind; and that when any one sang or played on an instrument, it would stand perfectly still, turn its ear to the place, and, with its head stretched out, would seem to pay the utmost attention. We are told that the emperor Maximilian had a tame Pelecan that lived more than eighty years, and always attended his soldiers when on their marches. M. de Saint Pierre.



1. Ursine Seal. 2. Narwal. 3. Porpesse. 4. Guiana. 5. Rindie.

become so stupid, that it is easy to take them in a net, or even by means of a noose thrown over their heads. In the year 1798, I saw one that had been seized whilst perched on the top of a rock just behind the town of Caernarvon; and in the year 1793, one of them was observed sitting on the vane of St. Martin's steeple, Ludgate Hill, London, and was shot from thence in the presence of a great number of people.

Their smell, when alive, is excessively rank and disagreeable; and their flesh is so disgusting, that even the Greenlanders, among whom they are very common, will scarcely eat them.

It is no uncommon thing to see, on the rocks of the sea-coast, twenty of these birds together, with extended wings, drying themselves in the wind: in this position they remain sometimes nearly an hour, without once closing their wings, and, as soon as these are sufficiently dry to enable the feathers to imbibe the oil, they press this substance from the receptacle on their rumps, and dress the feathers with it. It is only in one particular state that the oily matter can be spread on them; when they are somewhat damp: and the instinct of the birds teaches them the proper moment.

The skins of Corvorants are very tough; and are used by the Greenlanders, when sewed together and put into proper form, for garments. And the skin of the jaws serves that people for bladders to buoy up their smaller kinds of fishing darts.

In former times Corvorants were sometimes trained in this country, for the purpose of catching fish. They were kept with great care in the house: and when taken out for fishing, they had round their neck a leather thong, to prevent them from swallowing their prey: they were also hooded till brought to the water's edge. It appears that king Charles the First had an officer in his household entitled Master of the Corvorants.

THE GANNET, OR SOLAN GOOSE*.

These birds are insatiably voracious, and yet they are somewhat particular in their choice of prey; disdaining, unless in great want, to eat any food worse than herrings or mackrel. No fewer than one hundred thousand Gannets are supposed to frequent the rocks of St. Kilda; and of these, including the young-ones, at least twenty thousand are annually killed by the inhabitants for food. Allowing that the birds remain in this part of the country about six months in the year, and that each bird destroys five herrings in a day, which is considerably less than the average, we have at least ninety millions of the finest fishes in the world, annually devoured by a single species of Saint Kilda Birds.

The Gannets frequent nearly all the Hebrides, and are sometimes seen on the Cornish Coast; but they seldom occur in any other parts of Europe. They are migratory; and first appear in the above islands about

* DESCRIPTION. The Gannet is somewhat more than three feet in length, and weighs about seven pounds. The bill is six inches long: straight almost to the point, where it is a little bent: its edges are irregularly jagged, for the better securing of its prey; and about an inch from the base of the upper mandible there is a sharp process pointing forward. The general colour of the plumage is dirty white, with a cinereous tinge. Surrounding each eye there is a naked skin of a fine blue colour: from the corner of the mouth a narrow slip of naked black skin extends to the hind part of the head; and beneath the chin there is a pouch, capable of containing five or six herrings. The neck is long; the body flat, and very full of feathers. On the crown of the head, and the back part of the neck, is a small buff-coloured space. The quill-feathers, and some other parts of the wings, are black; as are also the legs, except a fine pea-green stripe in front. The tail is wedge-shaped, and consists of twelve sharp-pointed feathers.

SYNONYMS. *Pelecanus Bassanus*. Linn.—Fou de Bassan. Buffon.—Soland Goose. Willughby.—Solan Goose. Martin, Penn. Brit. Zool. ii. tab. 103.—Bew. Birds, ii. p. 393,

the month of March: they remain till August or September.

They build their nest on the highest and steepest rocks they can find near the sea; laying, if undisturbed, only one egg in the year; but if that be taken away, they will lay another, and if that be also taken, a third, but never more in the same season. The egg is white, and is rather smaller than that of the goose. The nests are composed of grass, sea plants, or any refuse fitted for the purpose, that the birds find floating on the water. The young Gannets, during the first year, differ greatly from the old ones; for they are of a dusky hue, and speckled with numerous triangular white spots. While the female is employed in incubation, the male supplies her with food; and the young birds, with their bill as a pincer, take their food from the pouch of the parent.

These birds, when they pass from place to place, unite in small flocks of from five to fifteen; and, except in very fine weather, they fly low, near the shore, but never pass over it; doubling the capes and projecting parts, and keeping at nearly an equal distance from the land. During their fishing they rise high into the air, and sail aloft over the shoals of herrings or pilchards, much in the manner of kites. When they observe the shoal crowded thick together, they close their wings to their sides, and precipitate themselves, head foremost, into the water, dropping almost like a stone. Their eye in this act is so correct, that they never fail to rise with a fish in their mouth.

Mr. Pennant says, that the natives of Saint Kilda hold these birds in much estimation, and often undergo the greatest risks to obtain them. Where it is possible, they climb up the rocks which they frequent, and in doing this they pass along paths so narrow and difficult, as, in appearance, to allow them barely room to cling, and that too at an amazing height over a raging sea. Where this cannot be done, the fowler is lowered by a rope from the top; and, to take the

young-ones, oftentimes stations himself on the most dangerous ledges. Unterrified, however, he ransacks all the nests within his reach; and then, by means of a pole and his rope, he moves off to other places to do the same. We are told, also, that to take the old birds, the inhabitants tie a herring to a board, and set it afloat; so that, by falling furiously upon it, the bird may break its neck in the attempt. This, however, is unlawful: the fastening of herrings thus to planks at sea, in order to catch the Solan Goose, is forbidden under a severe penalty.

Some years ago one of these birds was flying over Penzance, in Cornwall; when seeing some pilchards lying on a fir plank, in a place for curing these fish, it darted down with so much violence, as to strike its bill quite through an inch-and-a-quarter plank, and kill itself on the spot.

The Gannet seems to attend the herrings and pilchards during their whole progress round the British Islands; and it sometimes migrates in quest of food as far southward as the mouth of the Tagus, being frequently seen off Lisbon during the month of September. From this time till March, it is not well known what becomes of these birds.

The young birds, and the eggs, alone, are eatable; the flesh of the old ones being tough and rancid.

THE BOOBY*.

This and some other species have been denominated

* **DESCRIPTION.** The Booby is about two feet six inches in length. Its bill is nearly four inches and a half long, toothed on the edges, and of a gray colour. A space round the eyes, and on the chin, is naked. The head, neck, upper parts of the body, wings, and tail, are ash-coloured brown; and the breast, under parts, and thighs, white. The legs are pale yellow, and the claws gray.

SYNONYMS. *Pelecanus Sula*. *Linn.*—*Fou. Buff.*—Booby, *Caterby*.

Boobies from their excessive stupidity; their silly aspect; and their habit of continually shaking their head and shivering, when they alight on the yards or rigging of vessels, where they often suffer themselves to be taken with the hand. In their shape and organization they greatly resemble the corvorants.

The Boobies have an enemy of their own tribe, that perpetually harasses them. This is the Frigate *Pelecan**; which rushes upon them, pursues them without intermission, and obliges them by blows with its wing and bill, to surrender the prey that they have taken, which it instantly seizes and swallows. Catesby thus describes the skirmishes of the Booby and his enemy, which he calls the *pirate*: "The latter (he says) subsists entirely on the spoils of others, and particularly of the Booby. As soon as the Pirate perceives that it has caught a fish, he flies furiously against it, and obliges it to dive under water for safety: the Pirate, not being able to follow it, hovers above the water till the Booby is obliged to emerge for respiration, and then attacks it again while spent and breathless, and compels it to surrender its fish: it now returns to its labours, and has to suffer fresh attacks from its enemy." Leguet says, that the Boobies repair at night to repose on the island of Rodrigue; and that the Frigate, which is a large bird, and is so called from the rapidity of its flight, waits for them on the tops of the trees: it rises very high, and darts down upon them like a hawk upon his prey; not to kill them, but to make them disgorge. The Booby, struck in this way by the Frigate, throws up a fish, which the latter snatches in the air. Often the Booby screams, and discovers a reluctance to part with its plunder; but the Frigate scorns its cries, and rising again, descends with such a blow as to stun the poor bird, and compel an immediate surrender.

Dampier gives us a curious account of the hostilities

* *Pelecanus aquilus* of Linnæus.

between what he calls Man-of-war Birds*, and the Boobies, in the Alcrane Islands, on the coast of Yucatan. "These birds were crowded so thick, that I could not (he says) pass their haunts without being incommoded by their pecking. I observed that they were ranged in pairs; which made me presume that they were male and female. When I struck them, some flew away; but the greater number remained, and would not stir, notwithstanding all I could do to rouse them. I remarked also, that the Man-of-war Birds and the Boobies always placed sentinels over their young-ones, especially when they went to sea for provisions. Of the Man-of-war Birds, many were sick or maimed, and seemed unfit to procure their subsistence. They lived not with the rest of their kind; being either expelled from society, or separated by choice, and were dispersed in different places, probably that they might have a better opportunity of pillaging. On one of the islands I once saw more than twenty sally out from time to time into the open country, in order to carry off booty, and return again almost immediately. When one of them surprised a young Booby that had no guard, he gave it a violent peck on the back to make it disgorge; which it did instantly: it cast up one or two fish about the bulk of one's hand, which the old Man-of-war Bird swallowed. The vigorous ones play the same game with the old Boobies which they find at sea. I saw one myself, which flew right against a Booby; and, with one stroke of its bill, made him deliver up a fish that he had just swallowed. The Man-of-war Bird darted so rapidly, as to catch this fish in the air before it could fall into the water."

THE FISHING CORVORANT†.

The following account of this Chinese bird, by Sir

* These are, most probably, the Frigate Peleicans just mentioned.

† DESCRIPTION. This bird resembles in many respects the

George Staunton, is the most authentic of any that has yet been given to us :

"The embassy (he says) had not proceeded far on the southern branch of the Imperial Canal, when they arrived in the vicinity of a place where the Leutze, or famed fishing-bird of China, is bred, and instructed in the art and practice of supplying his owner with fish in great abundance.

"On a large lake close to this part of the canal, and to the eastward of it, are thousands of small boats and rafts, built entirely for this species of fishing. On each boat or raft are ten or a dozen birds, which, at a signal from the owner, plunge into the water; and it is astonishing to see the enormous size of the fish with which they return, grasped within their bills. They appeared to be so well trained, that it did not require either ring or cord about their throats, to prevent them from swallowing any portion of their prey, except what the master was pleased to return to them for encouragement and food. The boat used by these fishermen is of a remarkably light make; and is often carried to the lake, together with the fishing birds, by the men who are there to be supported by it."

M. de Buffon says, that they are regularly educated to fishing, as men rear spaniels or hawks, and one man can easily manage a hundred. The fisherman carries them out into a lake, perched on the gunnel of his boat; where they continue tranquil, and wait for his orders with patience. When arrived at the proper place, on the first signal, each flies a different way, to fulfil the task assigned to it. It is pleasant on this occasion to behold with what sagacity they portion out the lake or canal where they are upon duty. They hunt about,

common corvorant. It has been thus described: "Brown Pelecan or Corvorant, with white throat, the body whitish beneath, and spotted with brown; the tail rounded: the irides blue; and the bill yellow."

СНОУМ. *Pelecanus Sinensis.* Turton's Linn.

they plunge, they rise a hundred times to the surface, until they have at last found their prey. They then seize it by the middle, and carry it to their master. When the fish is too large, they assist each other; one seizes it by the head, and another by the tail, and in this manner they carry it to the boat together. There the boatman stretches out one of his long oars; on which they perch, and after being delivered of their burden, again fly off to pursue their sport. When they are wearied, he suffers them to rest awhile; but they are never fed until their work is over. In this manner they supply a very plentiful table; but still their natural gluttony cannot be reclaimed even by education. They have always a string fastened round their throats while they fish, for the purpose of preventing them from swallowing their prey; as they would otherwise at once satiate themselves, and discontinue their pursuit.

THE RED-BACKED PELECAN*.

Mr. Lewis, a navy surgeon, described to Dr. Latham the mode in which a Red-backed Pelecan, that had been brought up tame, stowed its food into its pouch. Like others of its race, it was very voracious. A number of different-sized fishes were laid before it on the ground. The bird first attempted to take up one that weighed ten pounds, but the bill was much too weak for this exertion; it, however, picked up as many as ten others, each of which weighed about a pound, arranged them in rows, with their heads towards the throat; and after this, it walked off in a stately manner, with the bag hanging down to its feet. The pouch held about two gallons of water.

* *Pelecanus rufescens* of Linnæus.

OF THE DARTER TRIBE IN GENERAL*.

There are but three ascertained species of this tribe, and these are confined to the hot latitudes; two to America, and the third principally to Ceylon and Java. They live almost entirely on fish, which they take by darting forward their bill. They generally build their nests and roost in the trees.

THE BLACK-BELLIED DARTER†, AND THE WHITE-BELLIED DARTER.

In countries where every one's ideas run on poisonous animals, any person who sees only the head and neck of the Black-bellied Darter, while the rest of the body is concealed among the foliage, would naturally mistake it for one of those serpents accustomed to climb into and reside in trees. And the illusion is increased by its having all the tortuous motions of those reptiles. In whatever situation it happens to be, whether swimming, flying, or at rest, the most apparent and remarkable part of its body, is its long and slender neck, which is constantly in motion, except during flight, when it becomes immoveable and extended, and forms, with the tail, a perfectly straight and horizontal line.

* These birds have a small head, and a very long and slender neck. Their bill is long, straight, and sharp-pointed, and, at its base, are the nostrils, situated in a long and conspicuous fissure. The face and chin are bare of feathers. The legs are short, and the four toes are all webbed together.

† DESCRIPTION. The length of this bird is about three feet. Its head and neck, and the upper part of the breast, are of a pale brown colour; and on each side of the head and neck there is a broad white line. The belly, wings, and tail, are black; as are also the back, scapulars, and wing-coverts, but these are marked with white lines. The bill is bluish above, and somewhat red beneath.

SYNONYMS. *Plotus Melanogaster*. *Linn.*—Anhinga de Cayenne. *Buff.*—Black-bellied Anhinga. *Penn. Ind. Zool.*—Black-bellied Darter. *Latham.*

The principal food of the Black-bellied Darter, is fish, which, if small enough, it swallows entire; but, if they are too large, it flies off with them to some rock or stump of a tree, where, fixing them under one of its feet, it tears them to pieces with its bill.

Though water is its principal element, yet this bird builds its nest and rears its offspring on rocks and trees; but always on those that are so near to the rivers, that it can, either in case of danger, or when the young-ones are old enough to swim, precipitate them into it.

There are few birds that exceed these in sagacity and cunning, particularly when surprised on the water. In this situation it is almost impossible to kill them. Their head, which is the only part exposed, disappears the instant the flint touches the hammer of the gun; and, if once missed, it is in vain to think of approaching them a second time, as they never show themselves more than once, unless at very great distances, and then only for the moment necessary for breathing. In short, so cunning are they, that they will often baffle the sportsman, by plunging at the distance of a hundred paces above, and rising again to breathe at the distance of more than a thousand below him; and, if they have the good fortune to find any reeds, they conceal themselves there, and entirely disappear.

These birds are found in several parts of the South of Africa, and in the islands of Ceylon and Java.

The *White-bellied Darters**, according to the account of Mr. Bartram, are natives of America. He

* DESCRIPTION. The White-bellied Darter is about two feet ten inches in length. The head, neck, and breast, are of a reddish-gray colour. The upper parts of the body are black. The scapular feathers have a white spot in the middle. The belly is white. The bill is cinereous, and yellowish at the base.

SYNONYMS. *Plotus Anhinga*. Linn.—*Anhinga*. Buffon.—Snake-bird. Bartram.—White-bellied Darter. Latham.

states, that they have a peculiar manner of spreading out their tail, like an unfurled fan. They delight to sit in little peaceable communities, on the dry limbs of trees, hanging over the still waters, with their wings and tail expanded; and, when approached, they drop from the limb into the water, as if dead, and for a minute or two are not seen, when on a sudden, at a vast distance, their long slender heads and necks are raised, and have much the appearance of snakes, as no other parts of the body are to be seen when swimming, except sometimes the tip of the tail. In the heat of the day they are often seen in great numbers, sailing high in the air over the rivers and lakes.

OF THE DIVER TRIBE IN GENERAL.*

These birds walk awkwardly, and with great difficulty; but they fly very swiftly along the surface of the water, and swim and dive with remarkable dexterity. One division of them, the Guillemots, chiefly inhabit the sea; but the rest seldom frequent any but rivers and fresh-water lakes. They all live on fish.

THE NORTHERN DIVER, OR LOON†.

Every part and proportion of this bird is so incomparably adapted to its mode of life, that in no instance do

* In the Divers the bill is slender, pointed, and nearly straight; the nostrils are linear, and situated at the base. The tongue is long and slender: and the legs are placed backwards near the tail.

† DESCRIPTION. The Northern Diver is nearly three feet and a half in length. The bill is black, and is four inches and a half long. The head and neck are of a deep velvet black. Under the chin there is a patch of white, marked with several parallel lines of black; and on each side of the neck, and on the breast, there is also a large portion of white marked in a similar manner. The upper parts are black, marked with

we see the wisdom of God in the creation to more advantage. The head is sharp; and smaller than the part of the neck adjoining, in order that it may pierce the water: the wings are placed forward, and out of the centre of gravity, for a purpose which will be noticed hereafter; the thighs are quite backward, in order to facilitate diving; and the legs are flat, and almost as sharp backwards as the edge of a knife, that, in striking, they may easily cut the water: while the feet are broad for swimming; yet so folded up, when advanced forward to take a fresh stroke, as to be full as narrow as the shank. The two exterior toes of the feet are longest; and the nails are flat and broad, resembling those of the human body; which give strength to the bird, and increase its power of swimming. The foot, when expanded, is not at right angles to the leg; but the exterior part, inclining towards the head, forms an acute angle with the body: the intention being, not to give motion in the line of the legs themselves, but by the combined impulse of both in an intermediate line, the line of the body.

Most people who have exercised any degree of observation, know that the swimming of birds is nothing more than walking in the water, where one foot succeeds the other as on the land; but no one, as far as I am aware, (says the Rev. Mr. White,) has remarked that diving-fowls, while under water, impel and row themselves forward by a motion of their wings, as well as by the impulse of their feet: yet such is really the case, as any one may easily be convinced, who will observe

white spots; and the under parts are white. The wings are short; and the quills, tail, and legs, are black. The female is smaller than the male.

This bird inhabits chiefly the northern seas, and is common on some of the coasts of Scotland.

SYNONYMS. *Colymbus glacialis*. Linn.—Imbrim. Buffon.—Greatest Speckled Diver, or Loon. Willughby.—Northern Diver. Pennant.—Penn. Brit. Zool. ii. tab. 84.—Bew. Birds, ii. p. 183.

ducks when hunted by dogs in a clear pond. Nor do I know that any one has given a reason why the wings of diving fowls are placed so forward: doubtless, not for the purpose of promoting their speed in flying, since that position certainly impedes it: but probably for the increase of their motion under water, by the use of four oars instead of two; and were the wings and feet nearer together, as in land-birds, they would, when in action, rather hinder than assist one another.

THE CHINESE DIVER*.

This is supposed to be one of the species of birds used by the Chinese for the catching of fish†. In that employment it has a ring fastened round the middle of the neck, to prevent its swallowing; it has also a long, slender string fastened to it. Thus accoutred, it is taken by its master into the fishing-boat, from the edge of which it is taught to plunge after the fish as they pass by; and, as the ring prevents these from passing down into the throat, they are taken from the mouth of the bird as fast as it catches them. In this manner it frequently happens that a great many are procured in the course of a few hours. When the keeper has thus procured a sufficient quantity of fish for himself, the ring is taken off, and the poor labourer is suffered to satisfy its own hunger.

* DESCRIPTION. The accounts that have been given of this bird are very imperfect. Its size is not known. Its bill is dusky. The upper parts of the plumage are greenish brown; and the fore part of the neck the same, but paler. The chin, and under parts, are yellowish white, marked with dusky spots. The legs are ash-coloured.

SYNONYM. *Colymbus Sinensis*. *Turton's Linn.*

† The bird most commonly used for this purpose by the Chinese fishermen is a species of pelean, the fishing corvoraunt; (*Pelecanus Sinensis*;) to which article the reader is referred for a further account of this singular mode of fishing.

OF THE GULLS IN GENERAL*.

The Gulls frequent chiefly the northern countries, and their habits differ from those of most other water-fowl. They do not dive so much as others; but they usually feed on the gregarious species of fish and their fry, which they catch near the surface of the water. When the sea is rough they come into the harbours, where they feed on worms. Some of them occasionally devour carrion; and Mr. Stackhouse, of Pendarvis in Cornwall, took from the craw of one of the common species, nearly a pint of the small fern-chafer, *Scarabæus horticola*. They are exceedingly voracious; and, when terrified, throw up their undigested food. By the lightness of their body, and the length of their wings, they are enabled to fly with considerable rapidity. The young-ones do not become of the same colour with the old birds, until their third year. The eggs are eatable, but their flesh is generally tough and unpleasant.

THE SKUA GULL†.

The Skua Gull inhabits Norway, the Fero islands,

* Their bill is strong, straight, and slightly hooked at the point. On the under part of the lower mandible there is an angular prominence. The nostrils are oblong and narrow, placed in the middle of the bill; and the tongue is somewhat cloven. The legs are short, and naked above the knees; and the back toe is small.

† DESCRIPTION. This bird is nearly two feet in length, and weighs about three pounds. Its bill is two inches and a quarter long, hooked at the end, and very sharp; and the upper mandible is covered more than halfway down with a black cere or skin, as in the hawk kind. The feathers of the upper parts of the body are of a deep brown, but below they are somewhat of a rust-colour. The talons are black, strong, and crooked.

SYNONYMS. *Larus Cataractes*. Linn.—Goeland Brun. Buffon.—Sea Eagle. Sibbald.—Cataractas, or Cornish Gannet. Ray. Willughby.—Brown Gull. Albin.—Bew. Birds, ii. p. 233.

and other parts of the north of Europe. It is the most formidable bird of its tribe; its prey being not only fish, but (what is wonderful in a web-footed bird) all the lesser sorts of water-fowl, and (according to the account of Mr. Schroter, a surgeon of the Fero Isles) ducks, poultry, and even young lambs.

In defending its offspring it has the fierceness of the eagle. When the inhabitants of the Fero islands visit the nest of the Skua Gull, the parent birds attack them with such force, that, if they hold a knife perpendicularly over their heads, the Gulls will sometimes transfix themselves in their fall on the plunderers. The Rev. Mr. Low, minister of Birfa, in Orkney, informs us, that, on his approaching the habitations of these birds, they assailed him, and the company along with him, in the most violent manner; and intimidated a bold dog in such a manner as to drive him for protection to his master. The natives, while attending their cattle on the hills, are often very rudely treated by these birds; and they are frequently obliged to guard their heads by holding up their sticks, on which (in the manner mentioned above) the birds often kill themselves.

In Foula, the Skua Gulls are privileged; being said to defend the flocks from the attacks of the eagle, which they beat off and pursue with great fury; so that even that rapacious bird seldom ventures to approach the places which they inhabit. The natives of Foula on this account impose a fine upon any person who destroys one of these useful defenders: and deny that they ever injure their flocks or poultry; but imagine them to live only on the dung of the Arctic Gull and other larger birds.

AMPHIBIOUS ANIMALS*.

Reptiles†.

OF THE TORTOISE TRIBE‡.

THE animals of this tribe have an advantage over most others, even from their first seeing the light, in a solid and durable house ; an asylum which is at the same time capable of resisting very powerful enemies, and yet is not fixed to one spot. They carry every where along with them the dwelling which their Creator has furnished, and under which they generally dwell in perfect security. This consists of two plates ; the one above, and the other below, joined together at the sides. The upper one is convex, and into it the ribs and back-bone are ossified : the other contains the breast-bones, or sternum.

At each end of the two united shells, there is a hole ; one for the head, neck, and fore-feet to pass through, and the other, at the opposite end, for the hinder feet, and the tail.

When these animals are inclined to walk or swim, they extend their head and feet from under their armour. These parts, with the tail, are covered by a

* For a general account of the *Amphibia*, see vol. i. p. 30.

† The *Reptiles* are furnished with legs. They have flat, naked ears, without auricles.

‡ The body is tailed, and covered above and beneath with a bony or coriaceous shell, or above with scales. The upper jaw encloses the lower one like the lid of a box.

strong, flexible skin, which is fixed within, to the edges of the shells.

The head is small, and in the place of teeth it is furnished with hard and bony ridges. The upper jaw closes over the lower one like the lid of a box; and the strength of the jaws is said to be so great, that it is impossible for any person to open them when they have once fastened. Even after the head has been cut off, the muscles retain a surprising degree of rigidity.

The legs are short, but inconceivably strong. One of the larger species has been known to carry five men, all at the same time, on its back, with the greatest apparent ease and unconcern.

No animals are more tenacious of life than these: even if their head be cut off, and their chest be opened, they will continue to live* for several days. The species that inhabit the land or the fresh-waters, subsist principally on worms, snails, and fish; and the others, which reside in the ocean, feed, for the most part, on seaweeds.

The Marine Tortoises, or *Turtles*, are distinguished from the others by their large and long fin-shaped feet, in which are enclosed the bones of the toes; the first and second only of each foot having visible or projecting claws.

Of these animals, there are, in the whole, about *thirty-six* species: four marine, eighteen inhabiting the fresh waters, and the rest residing on land.

THE COMMON OR GREEK TORTOISE*.

The upper shell of this Tortoise is so protuberant, that the animal is able, without much difficulty, to re-

* DESCRIPTION. The common Tortoise is seldom more than eight or nine inches in length, nor does its weight often exceed three pounds. The shell, which (as in most of the other species) is composed of thirteen middle pieces, and about twenty-five marginal ones, is of an oval form, extremely con-

cover its procumbent posture, if, by accident, it has been turned upon its back; and it does not, in this case, like some of the turtles, remain a prey to its enemies.

The jaws of the Greek Tortoise are moved by means of muscles, which have such extraordinary force and activity, that sometimes for more than half an hour after the head of the animal is cut off, they will gnash together with considerable force.

For extreme slowness in all its movements, the Tortoise has been notorious, even from the most remote periods of antiquity. This is principally occasioned by the position of the legs, which are situated very much towards the sides of the body, and are consequently spread far out from each other. It may likewise be in some degree caused by the great weight of the shell pressing on this unfavourable position of the legs. In walking, the claws of the fore-feet are rubbed separately, and one after another, against the ground; when one of the feet comes in contact with the ground, the inner claw first bears the weight of the body, and so on along the claws in succession to the outermost. The foot in this manner acts somewhat like a wheel.

This species resides principally in burrows that it forms in the ground. In these it sleeps away the great-

vex, and broader behind than before. The middle part is blackish brown, varied with yellow. The under part or belly of the shell is of a pale yellow, with a broad dark line down each side, leaving the middle part plain. The head is not large, nor does the opening of the mouth extend beyond the eyes: the upper part is covered with somewhat irregular scales. The legs are short, and the feet moderately broad, and covered with strong ovate scales. The tail is somewhat shorter than the legs: it is also covered with scales, but terminates in a horny tip.

This animal is found in most of the countries near the Mediterranean Sea, in Corsica, Sardinia, and some of the islands of the Archipelago, as well as in many parts of the north of Africa.

SYNONYMS. *Testudo Græca.* *Linnaeus.*—*Le Grecque.* *La Cepede.*—Common Land Tortoise, Greek Tortoise. *Shaw's Gen. Zool. vol. iii. tab. 1.*

est part of its time, appearing abroad only for a few hours in the middle of each day. It feeds on various kinds of herbs, fruit, worms, snails, and insects; but never attacks warm-blooded animals nor fish. Its manners are exceedingly gentle and peaceable; hence it is easily domesticated, and is an agreeable object in gardens, where it destroys noxious slugs and insects. In defect of its usual food, it may be supplied with, and will live sufficiently well on bran or meal.

In the autumn it retires to some hiding-place under the surface of the earth, where it remains in a state of torpor for four or five months, not again making its appearance abroad until re-called into life by the warmth of the vernal sun. About the beginning of June, the female, when in her native wilds, scratches a hole in some warm situation, where she deposits her four or five eggs. These are hatched in September; and the young-ones when they first come into the world, are not bigger than a walnut.

These animals have been often brought into England. The Rev. Mr. White, of Selbourne, attended accurately to the manners of one that, for upwards of thirty years, was in the possession of a lady of his acquaintance who resided in Sussex. It regularly retired underground about the middle of November, whence it did not emerge until about the middle of April. Its appetite was always most voracious in the height of summer, eating very little either in the spring or autumn. Milky plants, such as lettuces, dandelions, and sowthistles, were its principal food. In scraping the ground to form its winter retreat, it used its fore feet, and threw up the earth with its hinder ones over its back; but the motion of its legs was so slow, as scarcely to exceed the hour-hand of a clock. It worked with the utmost assiduity, both night and day, in scooping out the earth, and forcing its great body into the cavity; notwithstanding which, the operation occupied more than a fortnight before it was completed.

It was always extremely alarmed when surprised by

a sudden shower of rain during its peregrinations for food. Though its shell would have secured it from injury, even if run over by the wheel of a loaded cart, yet it discovered as much solicitude about rain, as a lady dressed in her most elegant attire; shuffling away on the first sprinklings, and always, if possible, running its head up into a corner. When the Tortoise is attended to, it becomes an excellent barometer: if it walk elate, and, as it were, on tiptoe, feeding with great earnestness, in a morning, there will almost invariably be rain before night.

Mr. White was much pleased with the sagacity of the above-mentioned animal, in distinguishing those persons from whom it was accustomed to receive attention. Whenever the good old lady came in sight, who had waited on it for more than thirty years, it always hobbled, with awkward alacrity, towards its benefactress, whilst to strangers it was altogether inattentive. Thus did the most abject of torpid creatures distinguish the hand that fed it, and exhibit marks of gratitude not always to be found in superior orders of animal being. It was a diurnal animal, never stirring out after dark, and very frequently appearing abroad even a few hours only in the middle of the day. It retired to rest during every shower, and in wet days never came at all from its retreat. Although this Tortoise loved warm weather, yet he carefully avoided the hot sun, since his thick shell, when once heated, must have become extremely painful, and probably dangerous to him. He therefore spent the more sultry hours under the umbrella of a large cabbage-leaf, or amidst the waving forests of an asparagus bed. But, as he endeavoured to avoid the heat in the summer, he improved the faint autumnal beams by getting within the reflection of a fruit-tree wall; and though he had certainly never read that planes inclining to the horizon receive a greater share of warmth, he frequently inclined his shell, by tilting it against the wall, to collect and admit every feeble ray.

This animal was at last given to Mr. White, and in

the Month of March, 1780, he dug it out of its winter dormitory, in order to convey it to his own house in Hampshire. The spring was a backward one; but the animal was become sufficiently recovered from its torpidity to express its resentment for the disturbance, by hissing. It was packed in a box, and carried eighty miles in post-chaises. The rattle and hurry of the journey so roused it, that when it was turned out on a border in Mr. White's garden, it walked twice down to the bottom. In the evening, however, the weather being cold, it buried itself in the loose mould, and remained concealed for above a month. Towards the time of its coming forth, it opened a breathing-place in the ground near its head, for it required, no doubt, a free respiration as it became more lively. On the twenty-first of April it heaved up the mould and put out its head; and on the following morning issued forth from its retreat, and walked about until four o'clock in the afternoon.

Very satisfactory evidence has been produced of this species of Tortoise living to a most extraordinary age. One that was introduced into the garden at Lambeth, in the time of archbishop Laud, was living in the year 1753, a hundred and twenty years after its introduction; and at last it perished, from a neglect of the gardener. In the year 1765, a Tortoise was living in the garden of Samuel Simmons, Esq. at Sandwich in Kent, which was known to have been there from about the year 1679; but how long before that period, no one could say with certainty. There is, however, good reason for supposing it to have been brought thither from the West Indies by a gentleman of the name of Boys, who was owner of the premises several years before the first period. This animal died in the winter of 1767. It had endeavoured (according to its annual custom) to burrow into the ground; but having selected for this purpose a spot near an old vine, its progress was obstructed by the root, and it probably had not strength enough to change its situation, as it was found dead

with only half its body covered. About thirty years before its death, it got out of the garden, and was much injured by the wheel of a loaded waggon, which went over it, and cracked its upper shell.

Like other oviparous quadrupeds the Tortoise can subsist for an amazing length of time without food. Gerard Blasius kept one by him ten months, during which time it neither ate nor drank. It died at the end of that period, as it was believed, not from hunger, but on account of being kept unsheltered in an unusually cold season.

The horrid experiments of Redi, to prove the extreme vital tenacity of the Tortoise, are disgraceful to human nature. In one instance he made a large opening in the skull, and drew out all the brain, washing the cavity, so as not to leave the smallest part remaining, and then, with the hole open, set the animal at liberty. It marched off, as he says, without seeming to have received the slightest injury, save from the closing of its eyes, which it never afterwards opened. In a short time the hole was observed to close, and in about three days a complete skin covered the wound: in this manner the animal lived without any brain, for six months, walking about, and still moving its limbs in the same manner as it had done previously to the operation.

The males of this species are said to fight very often. This is done by butting at each other, and with such force, that the blows may be heard at a considerable distance.

In Greece these Tortoises form an article of food. The inhabitants also swallow the blood without any culinary preparation, and are very partial to the eggs, when made palatable by boiling. In the gardens of some parts of Italy, there are formed for the purpose wells, in which the inhabitants bury the eggs of the Tortoise. These remain until the ensuing spring, when, by the natural warmth of the climate, they are hatched, and the young-ones come forth. The Tortoises are kept in banks of earth.

The two following Species are Marine Tortoises, or Turtles, as they are usually denominated.

THE GREEN TURTLE*.

This species is found in great numbers on the coasts of all the islands and continents of the Torrid Zone, both in the old and new worlds. The shoals that surround these islands, and border the whole coasts of these continents, produce vast quantities of *algae*, and other marine plants, which, though covered by the water, are near enough to the surface to be readily seen by the naked eye, during calm weather. Amid these submarine pastures, numerous marine animals are found, and amongst them the Green Turtles are often seen, in vast numbers, feeding quietly on the plants which are there produced.

As the Turtles find a constant abundance of food, on the coasts which they frequent, they have no occasion to quarrel with animals of their own kind, for that which is afforded in such plenty to them all. They flock

* See Plate xi. Fig. 5.

DESCRIPTION. The length of the Green Turtle is sometimes upwards of six feet, and the weight five or six hundred pounds. Dampier mentions an immensely large one that was caught at Port-royal, in the Bay of Campeachy. It was nearly six feet in width, and four feet in thickness. A son of Captain Roche, a boy about ten years old, went in the shell, as in a boat, from the shore to his father's ship, lying about a quarter of a mile distant. The shell of these animals is broader before than behind, where it is somewhat pointed. It consists of thirteen brownish divisions, surrounded by twenty-five marginal ones. Their mouth is so large as to open beyond the ears on each side. This is not armed with teeth, but the bones of which the jaws are composed, are very hard and strong, and furnished with points or asperities, that serve, in some degree, the same purpose.

SYNONYMS. *Testudo mydas.* *Linnaeus.*—Tortoue Franche. *La Cépède.*—Common Green Turtle, Common Turtle, Esculent Turtle. *Shaw.*—*Shaw's Gen. Zool.* vol. iii. tab. 22.

peaceably together ; but they do not appear, like many other herding animals, to have any kind of association. They merely collect, as if by accident, and they remain without disturbance.

These animals, by means of their powerful jaws, browse on the grass, sea-weed, and other plants which grow on the shoals and sand-banks ; and with them they are likewise able to crush the shell-fish on which they sometimes feed.

After having satisfied their appetites, they often retire to the fresh water, at the mouth of the great rivers, where they float on the surface, holding their heads above the water, apparently for the purpose of breathing the fresh air. But as they are surrounded with many dangers, both from their natural enemies, and from mankind, they are necessitated to use great precaution, in thus indulging themselves with cool air, and with the refreshing streams of river water. The instant they perceive even the shadow of any object, from which they suspect danger, they dive to the bottom for security.

The legs of the Green Turtles bear so great a resemblance to fins, as to afford them little service except in swimming. These animals are indeed seldom found on shore at any other than their breeding time, about the month of April ; when the females leave the water, from time to time, in order to deposit their eggs in the sand. By means of their fore paws, they each dig a hole in the sand, above high-water mark, about one foot wide, and two feet deep, into which they sometimes drop upwards of a hundred eggs. When engaged in this operation, they are so intent on the business, that they do not notice any person who approaches the place, and they will even drop their eggs into a hat if it be held under them. If, however, they be disturbed before the commencement of the operation, they always forsake the place. They lay their eggs at three, and sometimes four different times, about fourteen days asunder ; so that the young-ones are hatched and come

forth also at different periods. After the eggs are deposited, the parent scratches over them a layer of sand, sufficient to prevent them from being seen by any person or animal, that might endeavour to destroy or carry them off, but so thin as to admit of their receiving the full influence of the sun's heat, for warming and hatching them. The eggs are spherical, and each two or three inches in diameter, covered by a strong membrane greatly resembling wet parchment. They are composed of a yolk, which by boiling may be coagulated like that of other eggs, and of a white, which is said not to be coagulable in any other degree of heat.

At the end of twenty or thirty days, (for the time differs according to the heat of the climate,) the young Turtles may be seen creeping out from under the sand, being then two or three inches long, and not quite so much in breadth. Their natural instinct leads them, about eight days afterwards, (when they have attained sufficient strength,) to seek the neighbouring water, as a place of security, and where they may find their proper food. To this they crawl very slowly, and, being still too light, and too weak to bear the force of the surf, they are often driven back on the beach, where great numbers of sea-fowl are generally in waiting to devour them. Hence only a small number, in proportion to the multitudes that are hatched, escape into their proper element. Mankind likewise search, with great eagerness, for the eggs, on account of their furnishing an agreeable and wholesome food.

On the coast of Isini, in Africa, the inhabitants catch great numbers of the young-ones immediately after they are hatched. These they secure in a kind of enclosures, surrounded by stakes, and so situated as to admit the influx of the sea. Here they are allowed to feed and grow, in order to be taken out when wanted; this being a more ready and less dangerous mode of supply, than by the common manner of catching the grown animals.

The old females of this species, notwithstanding they only come on shore in the night, in order to deposit

their eggs, are often caught by the fishermen, who are in waiting about their haunts; and who either dispatch them by blows with a club, or turn them over on their backs. When they happen to be large, it sometimes requires the efforts of several men to turn one of them over, and these must often employ even handspikes or levers for that purpose. The back shell in this species is so flat, as to render it impossible for the animal to recover its proper position, when once it is thrown upon its back.

The inhabitants of the Bahama Islands are said to be very dexterous in the catching of Turtles. They frequent, for this purpose, the coasts of Cuba, and of some of the neighbouring islands. When they find the Turtles on land, they adopt the mode of throwing them on their backs, above described. But they take many in the sea, and often at a considerable distance from shore. These are struck with a kind of spear, whose shaft is about four yards in length. For this work two men usually get into a small and light boat, or canoe; one to paddle it gently along, and steer, and the other to stand at the head with his weapon. Sometimes the Turtles are discovered swimming with their head and back out of water; but they are most commonly seen lying at the bottom, where the water is a fathom or more in depth. If the animal perceives that he is discovered, he immediately attempts to escape. The men pursue and endeavour to keep him in sight, and generally so far tire him, that, in the course of half an hour, he sinks to the bottom, which affords them an opportunity to strike him with the spear through the shell. The head of the spear, which now slips off and is left in his body, is fastened with a string to the pole; and by means of this apparatus they are enabled to pursue him, if he should not be sufficiently spent without: if, however, that is the case, he tamely submits to be taken into the boat, or hauled ashore.

In some parts of the South Seas a peculiarly dexterous method of catching Turtles is adopted. A bold diver throws himself into the water, at some distance

from the place where the Turtles are observed floating asleep on the surface. He dives under the animals, and, rising gently behind one of them, seizes the upper shell near the tail, and pressing down the hinder part in the water, obliges the fore part of the animal, now awakened, to keep upright, and thus prevents it from diving, until his companions come with a boat, and take him and his prey on board.

Green Turtles are sometimes caught on the European shores, driven thither by stress of weather. In the year 1752, one, six feet long and four feet broad, weighing betwixt eight and nine hundred pounds, was caught in the harbour of Dieppe, after a storm. In 1754, a still larger one, upwards of eight feet long, was caught near Antioche, and was carried to the abbey of Long-veau, near Vannes, in Brittany; and in the year 1810 I saw a small one which had been caught amongst the submarine rocks near Christchurch, Hants.

These animals have their name from the green colour of the flesh. Besides affording to mankind their flesh and eggs for food, some of them yield betwixt twenty and thirty pints of a yellow or greenish oil, which is used in lamps for burning, or, when fresh, with different kinds of provisions. When the animals are caught in great numbers, their flesh is often salted for exportation. In the American colonies, salt Turtle is in as great request as the salted cod of Newfoundland is in many parts of Europe.

The introduction of the Turtle, as an article of luxury, into England, appears to have taken place within the last seventy years. We import these animals principally, if not entirely, from the West India islands.

THE LOGGERHEAD TURTLE*, AND IMBRICATED TURTLE.

These Turtles inhabit the seas about the West India

* DESCRIPTION. . This is a larger and stronger species than the last; but, in general appearance, bears a great resemblance

islands; they are also found in the Mediterranean, but particularly about the coasts of Italy and Sicily. In some seas they are more numerous than the green turtles; and being more strong, they occasionally make much longer voyages. They are often found in the ocean, at a distance of more than eight hundred leagues from land. One of them was seen by Catesby, sleeping on the surface of the water, in latitude 30 degrees north, apparently about midway betwixt the Azores and the Bahama islands.

They are excessively bold and fierce. When attacked they vigorously defend themselves, both with their mouth and paws, against the assailants; and it is extremely difficult to make them quit any hold which they happen to take with their jaws: so powerful are these, that the animals are able to divide even very strong substances by means of them. Aldrovandus assures us, that, on offering a thick walking-stick to the gripe of a Loggerhead Turtle, which he saw publicly exhibited at Bologna, the animal bit it in two in an instant.

The Loggerheads are not, like the Green Turtles, contented with marinc-plants: their principal food is shell-fish, which their strong beak enables them, without difficulty, to tear from the rocks and break to pieces; and their voracity is said to be such, that, in some countries, it leads them to attack even young crocodiles, which they often mutilate of their limbs or tail.

As the food of this species is, in its nature, more subject to putrefaction than that of the Green Turtle, its flesh participates of the bad flavour of these substances, and is oily, rancid, fibrous, tough, and fishy. The

to it. The head, however, is proportionally longer, and the shell broader; and the number of segments of the disk is fifteen, of which the middle range are gibbous, or protuberant towards their tips. The fore legs are large and strong, and the hind ones broad and shorter.

SYNONYMS. *Testudo Caretta*. Linn.—Couane. *La Cepede*
Shaw's Gen. Zool. vol. iii, tab. 23, 24, 25.

musky smell which proceeds from most of the tortoises, is peculiarly strong and disagreeable in this species.

The body of the Loggerhead Turtle yields a great quantity of oil, which is too offensive to be used in any manner as food; but it serves for lamps, for the dressing of leather, and for the bottoms of ships, which last it is said to preserve from the attacks of worms. The plates of the shell are not of sufficient thickness to be of great use in the manufacture of ornamental articles.

Rondeletius, who was a native of Languedoc, informs us that he kept alive, for a considerable time, a Turtle of this species, which had been caught on the coast of Provence.

The substance that we call *Tortoise-shell* is the production of the *Imbricated Turtle**, a species nearly allied to the present, which is found in the Asiatic and American seas, and sometimes in the Mediterranean. The plates of this species are far more strong, thick, and clear, than those of any other; and these constitute the sole value of the animal. They are semi-transparent, beautifully variegated with different colours, and, when properly prepared and polished, are used for a variety of ornamental purposes. They are first softened by being steeped in boiling water, after which they may be moulded into almost any form.

OF THE FROG TRIBE†.

The animals which compose this tribe are very generally dispersed over the globe. They feed on insects and worms, and reside principally in dark and unfrequented places, from which they crawl forth only in the

* *Testudo imbricata*, of Linnæus. Hawk's-bill Turtle, of several writers.

† These animals have each four feet; and their bodies are naked. When full grown they are destitute of tails. The hind legs are longer than the fore legs.

night. Many of them have an aspect very disgusting and unpleasant. Some, however, less unpleasant to the sight, are furnished with slender limbs, and have their toes terminated by flat, circularly-expanded tips, which enable them to adhere at pleasure to the surface of even the smoothest bodies: these reside generally in the trees, where they adhere to the lower sides of the leaves or branches.

All the species are oviparous, and the eggs are perfectly gelatinous. From the egg proceeds a Tadpole without feet, but furnished with a tail to aid its motion in the water: this drops off as the legs become protruded. In this imperfect state the animals have also a sort of gills or subsidiary lungs: and several of them have a small tube on the lower lip, by means of which they can fix themselves to solid bodies, for the purpose of eating, or of performing other functions. They all arrive at maturity about their fourth year, and very few outlive the age of ten or twelve.

The whole of this tribe catch their food by means of their tongue, which is inserted into the front of the mouth, and, when the animal is at rest, lies with its point towards the throat. The moment the animal observes an insect within its reach, this is suddenly thrown out, and the little victim is secured on its glutinous extremity.

In several of the species, the toes both of the fore and hind feet are separate; but in others, these are connected together by webs or membranes, for the purpose of aiding them in swimming.

The number of species hitherto described is about *fifty*. They are divided into three sections: namely,

1. *Frogs*, which have smooth bodies, longish legs, and discharge their eggs in a mass. These leap with great agility; and their hind legs are, in general, equal in length to the head and body.

2. *Hylæ*, or *Tree-Frogs*, which have their hinder legs very long, and the toes unconnected. These are generally smaller than Frogs, and more elegant in all

their proportions. Their toes are furnished with little viscid pellets, by means of which they are enabled to attach themselves even to the under surfaces of polished bodies. They are extremely nimble, leap with great force, and are able to pursue insects, on which they feed, with great agility, even on the branches and leaves of trees.

3. *Toads*, which have their bodies puffed up and covered with warts. These have short legs, and can scarcely be said to leap. They avoid the light, and seldom leave their retreats in search of prey except during the night. These animals discharge their eggs in a long necklace-like string.

THE COMMON FROG*.

In France this Frog is called *La Muette*, or the Silent Frog, from the circumstance of its voice being much less frequently heard, and being neither so loud nor so harsh, as that of the Edible Frog, the ensuing species. In the breeding season, however, these animals often emit a kind of dull cry or murmur, which is more frequently repeated by the male, and is louder in that sex than in the female.

The appearance of the common Frog is lively. The limbs are well calculated for aiding the peculiar motions of the animal, and its webbed hind feet for assisting its progress in the water, to which it occasionally retires during the heats of summer, and again in the frosts of winter. During the latter period, and till the return of warm weather, it lies in a state of torpor, either deeply

* See Plate xiv. Fig. 1.

DESCRIPTION. The colour of the Common Frog is olive brown, variegated on the upper parts of the body with irregular blackish spots. Beneath each eye there is a patch or mark, which reaches to the base of the fore legs.

SYNONYMS. *Rana temporaria*. Linn.—*La Rousse*, *La Muette*. *La Cepede*.—*Shaw's Gen Zool.* vol. iii. tab. 39.

plunged in the soft mud at the bottom of stagnant waters, or in the hollows beneath their banks. Immediately on coming forth in the spring, these animals change their skin, and this operation they repeat, generally about every eight or ten days, through the whole summer. The old skin, after it is separated from the body, resembles rather a kind of thin mucus than a membrane.

The spawn of this frog, which is generally cast in the month of March, consists of a clustered mass of gelatinous, transparent, and spherical eggs, from six hundred to a thousand in number, in the middle of each of which is contained the embryo or tadpole, in the form of a black globule. This sinks to the bottom of the water. During some hours it suffers no perceptible change; but when the eggs begin to enlarge, in consequence of becoming proportionally lighter, it rises to the surface. Roesel, the German naturalist, who paid great attention to this tribe, informs us, that at the end of eight hours the gelatinous part of the eggs grows thicker; and that the eggs themselves, as they increase in size, take somewhat of a spherical form. On the twenty-first day, the egg, if carefully examined, will be found to have opened a little on one side, where the tail of the tadpole makes its appearance; and this afterwards becomes more and more distinct every day. About the thirty-ninth day the little animals begin to have motion. Shortly after this, they tear asunder the membrane that immediately surrounds them, and float in the glairy fluid which connects the eggs together. The Tadpole at first quits this glairy matter only occasionally, as if to try its strength, and it soon afterwards returns, apparently for the double purpose of retreat and nourishment.

The tadpoles are furnished with a small tubular kind of sucker beneath the lower jaw, by means of which they are enabled to hang at pleasure to the under surface of aquatic plants. From the situation of this sucker, the little animal is obliged always to turn on its

back, when inclined either to respire or to lay hold of any substance on the surface of the water. The interior organs of the tadpole, when closely examined, are found to differ in many respects from those of the future frog. The intestines, in particular, are coiled into a flat, spiral form, somewhat resembling a cable in miniature. When the animal is about six weeks old, the hind legs appear, and in about a fortnight these are succeeded by the fore legs. Not long afterwards the form is completed, and the animal, for the first time, ventures upon land.

With this wonderful change of body, the animals also change their food : they now surrender their former vegetable diet, for the smaller species of snails, worms, and insects ; and the structure of their tongue is admirably adapted for seizing and securing this prey. The root is attached to the fore part of the mouth, so that when unemployed, the tongue lies with the tip towards the throat. The animal, by this singular contrivance, is enabled to bend it to a considerable distance out of its mouth. When it is about to seize on any object, it darts out the tongue with great agility, and the prey is secured on its broad and jagged glutinous extremity. This it swallows with so instantaneous a motion, that the eye can scarcely perceive the act. Nothing, however, can appear much more awkward and ludicrous, than a Frog engaged with a large worm or a small snake ; for nature seems to have put a restraint upon the voracity of these animals, by forming them very inaptly for seizing and holding their larger prey. Dr. Townson had a large Frog that one day swallowed in his presence a blind-worm*, nearly a span long, which in its struggles frequently got half its body out again ; and when completely swallowed, its contortions were very visible in the flaccid sides of its victor.

About the end of July, when the young Frogs have entirely laid aside their tadpole shape, they quit the water, and soon afterwards emigrate into the woods and

* *Anguis fragilis*, of Linnæus.

meadows. The commencement of their journey is always in the evening. They travel all night, and conceal themselves during the day, under stones, or in other recesses; and resume their journey only when the night begins. In the day-time, however, whenever it happens to rain, they come out of their retreats, as if to solace and refresh themselves in the falling moisture. Hence originated a superstition common among the lower classes of people throughout Europe. These immense multitudes of Frogs, thus often suddenly emerging, and afterwards as suddenly disappearing, have greatly puzzled the weak heads of the vulgar, who could not explain so wonderful a phenomenon, but by the strange conjecture, that they descended in showers from the clouds, or that they were suddenly engendered by the mixture of drops of rain with the dust; and that, as soon as the sun regained his influence, they were all immediately annihilated. Mr. Ray informs us, that as he was riding one afternoon in Berkshire, he was much surprised at seeing an immense multitude of Frogs crossing the road. On further examination he found two or three acres of ground nearly covered with them: they were all proceeding in the same direction, towards some woods and ditches that were before them. He traced them back to the side of a very large pond, which, in the spawning-time, he was informed, always so much abounded with Frogs, that their croaking was frequently heard at a great distance.

Frogs are numerous throughout Europe; and in the parts of America, about Hudson's Bay, as far north as the sixty-first degree of latitude. They frequent there the margins of lakes, ponds, rivers, and swamps; and as the winter approaches, they burrow under the moss, at a considerable distance from the water, where they remain in a frozen state till spring. Mr. Hearne says, he has frequently seen them dug up with the moss, frozen as hard as ice. In this state their legs may be as easily broken off as the stem of a tobacco-pipe, and

without communicating to them the least sensation ; but, by wrapping them up in warm skins, and exposing them to a slow fire, they soon come to life, and the mutilated animals gain their usual activity. If, however, they be permitted to freeze again, they are past all recovery.

The mode of respiration of these animals, in common with many of the other reptiles, is exceedingly curious. The organs adapted to this use are not placed in the belly, nor in the lungs themselves, but in the mouth. Behind the root of the tongue is the slit-like opening of the trachea ; and, at the front of the upper part of the head are two nostrils, through which only the animal draws the air, never opening its mouth for this purpose. Indeed, the jaws during this action, are kept closely locked into each other by grooves ; for if the mouth be open, the animal cannot respire at all, and it will presently be seen struggling for breath. When we carefully observe this Frog, we perceive a frequent dilatation and contraction in the skinny bag-like part of the mouth which covers the under jaw. From this it would appear, at first sight, as if the creature lived all the while on one mouthful of air, which it seems to be playing backward and forward, betwixt its mouth and lungs. But, for each movement in the jaw, a corresponding twirling movement may be observed in the nostrils. The mouth seems therefore to form a sort of bellows, of which the nostrils are the air-holes, and the muscles of the jaws, by their contraction and dilatation, make the draught. The nostrils are so situated, that the least motion on them enables them to perform the office of a valve. By the twirl of the nostril the air is let into the mouth, when a dilatation of the bag takes place : it is then emptied from the mouth, through the slit behind the tongue, into the lungs, when there is a slight motion in the sides of the animal, and the muscles of the abdomen again expel it ; and soon afterwards a second twirl in the nostrils takes place, and the like motions follow. Thus it appears

that the lungs are filled by the working of the jaws, or, in other words, that Frogs swallow air much in the same manner that we swallow food.

Frogs, during the greatest part of the year, remain on land; and do not altogether retire to the water until the cold nights of autumn begin to set in. They then retreat, for the winter, to the bottom of stagnant waters.

They arrive at full age in about five years, and are supposed to live twelve or fifteen; and these animals are so tenacious of life, that they will continue to live, and will even jump about for several hours after their heads have been cut off.

The croaking of Frogs is well known to all persons in the country. In the fens of Lincolnshire, these animals, in consequence of this noise, have received, among the common people, the appellation of *Dutch Nightingales* and *Boston Waites*. For a whole month, in the heat of summer, they, however, become entirely silent; and this period is called by the country people of many parts of England, the *Paddock Moon*.

These frogs are not so much in request for food as the following; their flesh not being so white, nor altogether so palatable. The hind-legs, however, are eaten, and the fore-legs and livers often form an ingredient in the continental soups.

THE EDIBLE FROG *.

The ova or spawn of this species, is not often deposited before the month of June. The globules are

* DESCRIPTION. The Edible Frog is considerably larger than the common species; and, though somewhat rare in England, is found in plenty in Italy, France, and Germany.

Its colour is olive green, marked with black patches on the back, and on its limbs with transverse bars of the same. From the tip of the nose, three distinct stripes of pale yellow extend to the extremity of the body; the middle one slightly depressed, and the lateral ones considerably elevated. The

much smaller than those of the common frogs; and the young animals (which undergo precisely the same changes as the young of that species) are considerably longer in attaining their complete state: this indeed seldom takes place till towards the beginning of November. They arrive at their full growth in about four years, and live to the age of sixteen or seventeen.

These Frogs, during their breeding season, make a noise so loud, that, in the night, it may be heard to a very considerable distance. This cry begins in the early part of the spring, as soon as the fine weather sets in. Like the rest of their tribe, they are said always to be most vociferous before rain, and thereby to foretel the approach of damp or rainy weather. In some particular places where the animals are numerous, their croaking is very oppressive to persons who are unaccustomed to it. The males are always much louder than the females.

Like the common species, these Frogs feed on various kinds of insects, worms, and snails; but they are somewhat nice in the choice of their food. They never seize any thing till they first perceive it to move. They remain motionless, waiting till the worm or insect comes within their reach; they then spring towards it with great agility, and dart out their tongue, which is smeared over with so tenacious a glue, that, when once it touches an insect, the latter can never escape. They are exceedingly voracious, sometimes venturing to attack and swallow young mice, small birds, and even newly-hatched ducks, when they can surprise these at the surface of the water.

This species lives a good deal in the water, from which, however, they often come out, both in search

under parts are of a pale whitish colour, tinged with green, and marked with irregular brown spots.

SYNONYMS. *Rana esculenta*. *Linnaeus*.—Le Grenouille commune ou mangeable. *La Copee*.—Esculent Frog, Green Frog. *Shaw*.—*Shaw's Gen. Zool.* vol. iii. tab. 31.

of food, and to bask in the sun. They become torpid at the commencement of winter; and this torpor generally takes place in some concealed retreat beneath the water, either in marshes, ponds, or lakes. Some few are found in subterraneous holes.

These creatures are brought from the country, thirty or forty thousand at a time, to Vienna, and sold to the great dealers, who have conservatories for them, which are large holes, four or five feet deep, dug in the ground, the mouth covered with a board, and in severe weather with straw. In these conservatories, even during a hard frost, the Frogs never become quite torpid. When taken out and placed on their backs, they are always sensible of the change, and have strength enough to turn themselves. They instinctively get together in heaps, one upon another, and thereby prevent the evaporation of their humidity; for no water is ever put to them. In Vienna, in the year 1793, there were only three great dealers; by whom most of those persons were supplied who brought them to the market ready for the cook.

The Edible Frogs are caught in various ways: sometimes in the night, by means of nets, collecting together round the light of torches that are carried out for the purpose; and sometimes by hooks, baited with worms, insects, flesh, or even a bit of red cloth. Being exceedingly voracious, they seize, greedily, every thing that moves, and, when once they have fixed, they keep their hold with great tenacity. In Switzerland they are caught by means of large rakes, with long, close-set teeth, which are thrown into the water, and drawn suddenly out again.

From their spawning-time being very late in the year, it is supposed that those animals which are brought to market before the month of June for the Edible Frog, are either common frogs, or sometimes that they are even toads.

THE BULL FROG

The interior parts of America are the principal residence of this species, where, at the springs or small rills, they are said to sit in pairs. In Virginia they are in such abundance, that there is scarcely any where a spring that has not a pair of them. When suddenly surprised, they leap into their hole, at the bottom of which they lie perfectly secure. The inhabitants fancy that these frogs purify the water, and they accordingly respect them as genii of the fountains.

Their croaking somewhat resembles the hoarse lowing of a bull; and when, in a calm night, many of these animals are making a noise together, they may be heard to the distance of a mile and a half. The night is the time when they croak, and they are said to do this at intervals. In this act they are either hidden among the grass or rushes, or they are in the water, with their heads above the surface. Kalm informs us, that as he was one day riding out he heard one of them roaring before him, and supposed it to be a bull hidden in the bushes at a little distance. The voice was indeed more hoarse than that of a bull, yet it was much too loud for him to imagine that it could be emitted by so small an animal as a Frog, and he was in considerable alarm for his safety. He was undeceived a few hours afterwards, by a party of Swedes, to whom he had communicated his fears.

When alarmed, these animals leap to a most surprising distance at each exertion. A full-grown Bull Frog

DESCRIPTION. This is an animal that frequently measures from the nose to the hind feet a foot and a half, or upwards. The colour of its body is a dusky olive or brown, marked with numerous dark spots, lighter beneath than above. The external membranes of the ears are large, round, and of a brownish-red, surrounded by a yellowish margin.

SYNONYMS. *Rana Catesbeiana.* Shaw.—*Rana ocellata.* Linn.—*La Mugissante, ou Grenouille Taureau.* *La Cepede.*—*Shaw's Gen. Zool. vol. iii. tab. 33.*

will sometimes leap three yards. The following story respecting one of them is well authenticated. The American Indians are known to be excellent runners, being almost able to equal the best horse in its swiftest course. In order, therefore, to try how well the Bull Frogs could leap, some Swedes laid a wager with a young Indian, that he could not overtake one of them, provided it had two leaps beforehand. They carried a Bull Frog, which they had caught in a pond, into a field, and burnt its tail. The fire, and the Indian who endeavoured to outrun the Frog, had together such an effect upon the animal, that it made its long leaps across the field as fast as possible. The Indian pursued it with all his might. The noise he made in running frightened the Frog: probably it was afraid of being tortured with fire again, and therefore it redoubled its leaps, and by that means reached the pond, which was fixed on as the goal, before the Indian could overtake it.

The women are no friends to these Frogs, because they kill and eat young ducks and goslings; and they sometimes carry off chickens that venture too near the ponds. During winter they remain in a torpid state under the mud, and in spring they commence their bel-lowings.

They are edible, and have frequently as much meat on them as a young fowl. A few years ago, some of these animals were brought alive into this country.

THE GREEN TREE-FROG*.

Were it not from the deeply-rooted prejudices which are imbibed, during childhood, against all the animals

* See Plate xiv. Fig. 2.

DESCRIPTION. This Frog is small, and of slender and very elegant shape. All its upper parts are green, and the abdomen is whitish, marked by numerous granules. The under surface of the limbs is reddish; and on each side of the body

of the Frog tribe, the beauty of colour, and the elegance of motions of the present species are such, that they would afford delight to every beholder. During the summer months it resides principally among the upper branches of trees, where it wanders among the foliage in quest of insects. These it catches with great dexterity, stealing softly towards them as a cat does towards a mouse, till at a proper distance, when it makes a sudden spring upon them, of frequently more than two feet in height. It often suspends itself by its feet, or abdomen, to the under parts of leaves; and, in this position, remains concealed among the foliage.

The skin of the abdomen is covered with small glandular granules, of such a nature as to allow the animal to adhere as well by these as by the toes. It will even stick to a glass, by pressing its body against it.

Although during summer it inhabits woods, yet, about the end of autumn, it retires to the waters, and lies concealed in a torpid state, in the mud, or under banks, till the spring. At the return of warm weather, it emerges, like the rest of its tribe, in order to deposit its spawn in the water. This is done about the end of April, or the beginning of May; and, as soon as the operation is over, the animals return to their accustomed haunts in the trees. The offspring continue until the month of August in their tadpole state.

During the breeding season the male inflates his throat in a very surprising manner, so much indeed as to form a tolerably large sphere beneath his head.

there is a longitudinal blackish or violet-coloured streak. The body is smooth above, and the hind legs are very long and slender. At the end of each toe there is a round, fleshy, concave apparatus, not unlike the mouth of a leech, by means of which the animal is enabled to adhere even to the most polished surfaces.

SYNONYMS. *Rana arborea*. Linn.—*Rana bilineata*. Shaw.
—*La Reine vert*, ou commune. *La Cepede*.—*Shaw's Gen. Zool.*
vol. iii. tab. 38.

He then also exerts a very rough croak, that may be heard to a vast distance. Whenever one of these frogs begins, all that are within hearing join in the discordant chorus; and the whole is so loud, as almost to resemble the noise of a pack of hounds: this, in still evenings, especially before rain, when they most exert themselves, has been heard nearly three miles. These frogs are said to be so excellent as barometers, that, if kept in glasses in a room, and supplied with proper food, they will afford a sure presage of changes in the weather.

In order to make some observations on the respiration of the Reptile tribe, Dr. Townson had, among others, some Tree-Frogs. He kept them in a window, and appropriated to their use a bowl of water, in which they lived. They soon grew quite tame; and to two that he kept for a considerable length of time, and were particular favourites, he gave the names of Damon and Musidora. In the hot weather, whenever they descended to the floor, they soon became lank and emaciated. In the evening, they seldom failed to go into the water, unless the weather was cold and damp; in which case they would sometimes remain out for a couple of days. When they were out of the water, if a few drops were thrown upon the board, they always applied their bodies as close to it as they could; and from this absorption through the skin, though they were flaccid before, they soon again appeared plump. A Tree-Frog that had not been in water during the night was weighed, and then immersed: after it had remained about half an hour in the bowl it came out, and was found to have absorbed nearly half its own weight of water. From other experiments on Tree-Frogs, it was discovered that they frequently absorbed, by the under surface only of their body, nearly their whole weight of water. These animals will even absorb moisture from wetted blotting-paper. Sometimes, with considerable force, they eject water from their bodies, to the quantity of a fourth part or more of their own weight.

Both Frogs and Toads will frequently suffer their

natural food to remain before them untouched, yet if it make the smallest motion, they instantly seize it. A knowledge of this circumstance enabled Dr. Townson to feed his favourite Tree-Frog, Musidora, through the winter. Before the flies, which were her usual food, had disappeared in autumn, he collected for her a great quantity, as winter provision. When he laid any of them before her, she took no notice of them; but the moment he moved them with his breath, she sprung upon and ate them. Once, when flies were scarce, the Doctor cut some flesh of a tortoise into small pieces, and moved these by the same means. She seized them, but the instant afterwards rejected them from her tongue. After he had obtained her confidence, she ate, from his fingers, dead as well as living flies. Frogs will leap at a moving shadow of any small object; and both Frogs and Toads will soon become sufficiently familiar to sit on the hand, and be carried from one side of a room to the other, in order to catch flies as they settle on the wall. At Gottingen, Dr. Townson made them his guards for keeping these troublesome creatures from his dessert of fruit, and they acquitted themselves to his satisfaction. He has even seen the small Tree-Frogs eat humble bees, but this was never done without some contest. The Frogs were in general obliged to reject them, being incommoded by their stings and hairy roughness; but, in each attempt, the bee was further covered with viscid matter from the Frog's tongue, and, when sufficiently coated with this, it was easily swallowed.

A Tree-Frog was kept by a surgeon in Germany for nearly eight years. He had it in a glass vessel covered with a net, and during the summer he fed it with flies; but in winter it probably did not eat at all, as only a few insects, with grass and moistened hay, were put to it. During this season it was lean and emaciated; but in summer, when its favourite food could be procured in plenty, it soon again became fat. In the eighth winter it pined away by degrees, on account, as was supposed, of a deficiency of its insect food.

As Captain Stedman was sailing up one of the rivers of Surinam in a canoe, an officer who was with him observed, in the top of a mangrove tree, a battle between a Snake and a Tree-Frog. When the captain first perceived these animals, the head and shoulders of the Frog were in the jaws of the snake, which was about the size of a large kitchen poker. This creature had its tail twisted round a tough limb of a mangrove tree; whilst the Frog, which appeared about the size of a man's fist, had laid hold of a twig with his hind feet. In this position they were contending, the one for life, the other for his dinner, forming one straight line between the two branches; and thus they continued for some time, apparently stationary, and without a struggle. Still it was hoped that the frog might extricate himself by his exertions: but the reverse was the case. The jaws of the snake gradually relaxing, and by their elasticity forming an incredible orifice, the body and fore legs of the Frog, by little and little, disappeared, till finally nothing more was seen than the hinder feet and claws, which were at last disengaged from the twig, and the poor creature was swallowed whole by his formidable adversary. He passed some inches down the alimentary canal, and there stuck, forming a knob or knot, at least six times as thick as the snake, whose jaws and throat immediately contracted, and reassumed their former natural shape.

This Frog is a native of various parts of America; of France, Germany, Italy, and many other European countries, but is not found in Great Britain

THE COMMON TOAD *.

The Toad is an animal known to every one; and by

* See Plate xiv. Fig. 3.

SYNONYMS. *Rana bufo*. Linn.—Le Crapaud commun. La Cépède.—Shaw's Gen. Zool. vol. iii. tab. 40.

his livid appearance, and sluggish and disgusting movements, is easily recognized.

In some countries, as at Carthagenæ, and Porto Bello, in America, Toads are so extremely numerous, that, in rainy weather, not only all the marshy ground, but the gardens, courts, and streets, are almost covered with them; so much so, that many of the inhabitants believe that every drop of rain is converted into a Toad. In these countries the Toad is of great size, the smallest individuals measuring at least six inches in length. If it happen to rain during the *night*, all the Toads quit their hiding places, and then crawl about in such inconceivable numbers, as almost literally to touch each other, and to hide the surface of the earth: on such occasions it is impossible to stir out of doors without trampling them underfoot at every step.

The female Toads deposit their spawn early in the spring, in the form of necklace-like chains or strings of beautifully transparent gluten, three or four feet in length, enclosing the ova in a double series throughout. These have the appearance of so many jet-black globules: they are, however, nothing more than the larvæ or tadpoles lying in a globular form, which break from their confinement in about a fortnight, and afterwards undergo changes similar to the tadpoles of the frog. They become complete towards the beginning of autumn, about which time the young animals are frequently to be seen in immense multitudes. When they have undergone all the variations of their tadpole state, they forsake the water, and are often to be seen in a moist summer's evening, crawling up, by myriads, from fenny places into situations somewhat more dry. There, having found a place of retreat, or each having formed one for itself, they lead a solitary life, seldom venturing abroad except in moist evenings. At this period of the year they have a sufficient supply of food, in the snails and worms with which the grass and pathways are then covered.

When it is irritated, the Toad emits from various

parts of its skin a kind of frothy fluid, which, in our climate, produces no other unpleasant symptoms than slight inflammation, from its weakly acrimonious nature. Dogs, on seizing these animals, appear to be affected with a slight swelling in their mouth, accompanied by an increased evacuation of saliva. The limpid fluid which the Toad suddenly ejects from his body when disturbed, has been ascertained to be perfectly free from any noxious qualities. It is merely a watery liquor, the contents of a peculiar reservoir, which, in case of alarm, appears to be emptied in order to lighten the body, that the animal may the more readily escape. It is its extremely forbidding aspect only that has obtained for the Toad its present unjust character of being a dangerously poisonous animal. It is persecuted wherever it appears, on the supposition merely that because it is ugly it must in consequence be venomous. Its eyes are, however, proverbially beautiful, having a brilliant, reddish, gold-coloured iris surrounding the dark pupil, and forming a striking contrast with the remainder of its body. Hence Shakspeare, in *Romeo and Juliet*, remarks:

Some say the Lark and loathed Toad change eyes.

Its reputation as a poisonous animal obtained for it, among the superstitious, many preternatural powers, and the repeated dealers in magic art are stated to have made much use of it in their compounds. This circumstance caused it to be inserted among the ingredients adopted by the witches in *Macbeth*, to raise the spirits of the dead:

Toad that under the cold stone
Days and nights has thirty-one
Swelter'd venom, sleeping got,
Boil thou first i' th' charmed pot.

It is no difficult task, singular as it may appear to those who have never attended to this animal, to render

it so tame, that it may be taken up into the hand, and carried about a room to catch flies that alight on the walls. A correspondent of Mr. Pennant supplied him with some curious particulars respecting a domestic Toad, which continued in the same place for upwards of *thirty-six* years. It frequented the steps before the hall-door of a gentleman's house in Devonshire. By being constantly fed, it was rendered so tame as always to come out of its hole in an evening when a candle was brought, and to look up, as if expecting to be carried into the house, where it was frequently fed with insects. An animal of this description being so much noticed and befriended, excited the curiosity of all who came to the house, and even females so far conquered the horrors instilled into them by their nurses, as generally to request to see it fed. It appeared most partial to flesh-maggots, which were kept for it in bran. It would follow them on the table, and, when within a proper distance, would fix his eyes and remain motionless for a little while, apparently to prepare for the stroke which was to follow, and which was instantaneous. It threw out its tongue to a great distance, and the insect, stuck by the glutinous manner to its tip, was swallowed by a motion quicker than the eye could follow. After having been kept more than thirty-six years, it was at length destroyed by a tame raven, which one day, seeing it at the mouth of its hole, pulled it out, and so wounded it that it died.

The spider was formerly considered an inveterate enemy to the Toad; and it has been said, that whenever these animals met, a contest always took place, in which, from its superior dexterity and address, the former often proved victorious. If this relate to the European spiders and Toads, it is wholly devoid of foundation.

Like the rest of the animals of its tribe, the Toad becomes torpid towards the conclusion of the autumn, and remains so during all the winter months. The place of its retreat is either in the cleft of some rock, under the

hollow root of a tree, or among the mud at the bottom of stagnant pools. It is long-lived; and so extremely difficult to be killed, that though its body be covered with lacerations, it will continue to exhibit signs of life for many hours afterwards.

Of the Toad we have a property recorded, more astonishing than what is mentioned of most other animals, that of continuing alive for centuries, enclosed in solid substances. Although some allowance should be made for that natural love of the marvellous which pervades the great mass of mankind, yet we have too many respectable authorities for the fact, and too frequent instances of its recurrence, to allow us to doubt its truth. For the amusement of the reader, I shall cite a few of the best-authenticated of these. In the year 1719, M. Hubert, Professor of Philosophy at Caen, was witness to a living Toad being taken from the solid trunk of an elm-tree. It was lodged exactly in the centre, and filled the whole of the space that contained it. The tree was in every other respect firm and sound. Dr. Bradley saw a Toad taken from the trunk of a large oak. In the year 1733, a living Toad was discovered by M. Graburg, in a hard and solid block of stone, which had been dug up in a quarry in Gothland. On being touched with a stick upon the head, he informs us that it contracted its eyes, as if asleep, and, when the stick was removed, it gradually opened them. Its mouth had no aperture, but was closed round by a yellowish skin. On being pressed with the stick on the back, a small quantity of clear water issued from it behind, and it immediately died. A living Toad was found in a block of marble at an old castle belonging to Lord Tankerville, twelve miles from Alnwick in Northumberland. A stone-cutter of the name of Charlton, found in the Isle of Ely a living Toad, enclosed in a block of marble. The cavity in which it was contained, was somewhat larger than, but nearly of the figure of, the animal. The Toad seemed in perfect

health, although the marble was, on all sides, several inches thick.

THE PIPA, OR SURINAM TOAD*.

This creature, in the production of its offspring, affords a very singular deviation from the usual course of nature. On the back of the female are formed certain cavities, opening outward, and somewhat resembling the cells of a bee-hive. They are of a circular form, about half an inch deep, and each nearly a quarter of an inch in diameter. They are at a little distance from each other, and somewhat irregularly ranged. At a certain period of incubation, if it may be so called, each of these cells is found to contain a little live toad, an exact miniature in all respects of its parent; but how it finds subsistence there, (for the creature has no adhesion to the parent, but may easily be taken out, as from a case, and again replaced without injury,) does not seem as yet to be fully ascertained. Mr. Ferman, who has described this animal, declares himself to have been an eye-witness to the procedure. The eggs are generated within the female, who, when they have attained the proper degree of maturity, drops them on the ground. The male amasses together the heap, and deposits them, with great care, on the back of the fe-

* DESCRIPTION. The Pipa, which is a native of Surinam, is at first view an extremely hideous and deformed animal. It is considerably larger than our toad, has a flattish body, and a somewhat triangular head. The mouth is very wide, and furnished at the edges or corners with a kind of cutaneous appendage. The fore feet have four long and thin toes, each divided at the tip into four distinct parts, which, when inspected with a magnifier, are found to be each again obscurely subdivided almost in a similar manner. The hind feet have five toes united by a web. The male and female are so different in appearance from each other, as frequently to be mistaken for different species.

SYNONYMS. *Rana Pipa*. *Linnaeus*.—*Le Pipa*, ou *Cururu*. *La Cepede*.—*Shaw's Gen. Zool. vol. iii. tab. 50, 51.*

male, where, after impregnation, they are pressed into the cellules, which are at that period open for their reception, and which afterwards close over them. The ova remain in the cellules until the second birth, which takes place in somewhat less than three months, when the young-ones emerge from the back of the parent, completely formed. During the time of concealment, they undergo the usual change of the rest of the genus, into the tadpole state, and this form they entirely put off before their final extrusion. After all the young-ones are come forth, the female rids herself of the cells, and at the same time of part of her skin, by rubbing herself against stones or vegetables, and the injured skin is soon renewed by a fresh growth.

In this singular production of its young, the *Pipa* seems to bear considerable analogy to the different species of opossum. Ferman says, that the *Pipa* is only calculated for having one breed. The number of young-ones produced by a female that he observed, was seventy-five; and they were all perfected in the space of five days after they first appeared.

It would seem that the flesh of this Toad is not unwholesome, as, according to Madame Merian, the negroes of Surinam eat of it with pleasure, and suffer no inconvenience from its use.

OF THE LIZARD TRIBE.

The animals of this tribe, which have each four legs and a tail, are distinguishable at first sight from other oviparous quadrupeds. They have no shields, like the tortoises, and they are all furnished with tails, which are entirely wanting in toads and frogs. Their bodies are either covered with scales, of greater or less rigidity, or with a kind of warts or tubercles. Some of the species are scarcely more than two inches in length, whilst others exceed even the length of five or six and twenty feet.

Their tails, at the base, are nearly as thick as the

hinder part of the body from which they rise. In some species these are flat; in others rounded: in some short and thick; and in others more than twice as long as the body, and tapering to a slender point. The tail of the chameleon is *prehensile*, that is, the animal can coil it fast round any object, in order to prevent itself from falling.

The Lizards are principally inhabitants of the warmer regions of the globe. The larger ones live on animals, which they seize by stratagem, and the smaller ones on insects. Many of them serve mankind for food. The aquatic species undergo a metamorphosis, from a tadpole to a perfect state. Most of them are produced from eggs externally, but some are brought forth alive. In this tribe are found nearly the largest and the smallest animals in the creation.

Although in many of the species the colour and form are exceedingly beautiful, these animals, like the toad, have obtained the general character of being poisonous. The whole tribe, however, (except one species, the Spitting Lizard*, which, when irritated, discharges a black and acrid matter, easily cured by camphorated spirits of wine,) is destitute of poison.

THE CROCODILE†.

As Providence seems to have appointed the lion to the dominion of the immense deserts of the torrid zone; the eagle to rule as sovereign of the air; and has committed the government of the seas to the whale: so it seems to have appointed the Crocodile and the Alligator to rule over the shores of the immense rivers of tropical cli-

* *Lacerta Sputator*, of Linnæus.

† See Plate xiv. Fig. 4.

SYNONYMS. *Lacerta Crocodilus*. Linnæus.—Le Crocodile proprement dit. *La Cépède*.—Cayman. *Bosman*.—Nilotic Crocodile, Common Crocodile. *Shaw*.—*Shaw's Gen. Zool.* vol. iii. tab. 55, 56, 57.

mates. Living, as it were, on the confines both of land and water, these enormous animals extend their dominion equally over the inhabitants of both elements. Here they enjoy an absolute rule, and dread none of the common dangers which assault other less powerful animals.

If we except the elephant, the hippopotamus, and the whale, these are the largest animals that have yet been discovered. Some of them have been known to attain the length of twenty-five feet and upwards; and, probably, like fishes, their bulk continues to increase during their whole life.

The Crocodile has no lips; so that even when walking or swimming with the utmost tranquillity, the teeth are bare, and the aspect seems animated by rage. Another circumstance that contributes to increase the terrific appearance of its countenance, is the fiery glare of its eyes; and these, being situated near each other, have also a malignant aspect.

The armour with which the Crocodile is clad, may be accounted among the most elaborate pieces of natural mechanism. In the full-grown animal it is so strong, as easily to repel a musket-ball. On the lower parts it is much thinner and more pliable than on the upper. The whole animal appears as if covered with the most regular and curious carved work. The colour of the full-grown Crocodile is blackish-brown above, and yellowish-white beneath. The upper parts of the legs and sides are varied with deep yellow, somewhat tinged with green. The mouth is of vast width, and furnished with numerous sharp-pointed teeth, thirty or more on each side of the jaws; and these are so disposed, as, when the mouth is closed, to fit alternately above and below.

The Crocodile and Alligator have the largest mouths of almost any land animals. It has been asserted by various writers, that both their jaws are moveable. A single glance, however, at the skeleton, will afford sufficient proof, that the upper jaw is fixed, and that

the motion is altogether confined to the under one. These animals are also generally believed to have no tongue. This again is an error, for the tongue in both species is larger than that of the ox ; but it is so connected with the sides of the lower jaw, as to be incapable of being stretched far forward, as in other animals.

In the water the Crocodile seems to enjoy his whole strength with much greater advantage than on land. Notwithstanding his size, and his apparent unwieldiness, he moves about in the water with considerable agility, often emitting a kind of silent, half-suppressed murmuring noise. Although the great length of his body prevents him from turning suddenly round, he swims forward with astonishing velocity when about to seize his prey. On land his motions are much more embarrassed, and he is consequently there a less dangerous enemy than in the water.

Except when pressed by hunger, or urged by the necessity of depositing its eggs, this enormous creature seldom leaves the water. Its usual method is to float along upon the surface, like a large piece of timber, and seize whatever animals come within its reach ; but, when this method fails, it then goes closer to the bank. There it waits in patient expectation of some land animal that may come to drink ; the dog, the bull, the tiger, or man himself. Nothing is to be seen in approaching the river, nor is its retreat discovered till it is too late for safety. It seizes the victim with a spring, and goes at a bound much further than such an unwieldy animal could be supposed capable of doing. Then, having secured the prey, it drags it into the water, instantly sinks with it to the bottom, and, in this manner, quickly drowns it. Sometimes it happens that the creature wounded by the Crocodile makes its escape ; in which case, the latter pursues and often takes it a second time. He seldom moves far from rivers, except in covert and marshy places ; so that, in many parts of the East, it is very dangerous to walk carelessly on the banks of unknown rivers, or among sedgy

grounds; and still more so to bathe, without the utmost circumspection, in unfrequented places.

All the rivers of Guinea are pestered with vast shoals of Crocodiles. On hot days, great numbers of these animals lie basking on the banks of rivers, and as soon as they observe any one approach, they plunge into the water. M. Adanson says, that in the river Senegal, on the western coast of Africa, he has sometimes seen more than two hundred of them swimming together, with their heads just above water, resembling a great number of trunks of trees floating down the river. In the neighbourhood of Thebes, in Egypt, the small boat, in which M. Sonnini sailed up the river, was often surrounded by Crocodiles on a level with the surface. They observed the boat pass by them, but with apparent indifference.

The French soldiers in Egypt are stated to have set the Crocodiles at defiance. They were not once attacked by them, nor did they ever meet with a Crocodile at a distance from the river. It is probable that these animals find in the Nile itself a sufficient quantity of food, which is not difficult to be procured, and which, as in all other cold-blooded animals, they digest very slowly.

The young of the Crocodile are produced from eggs deposited in the sand, and hatched by the heat of the sun, near the bank of some river or lake. The female is said to be extremely cautious in depositing them unobserved. The general number of eggs is from eighty to a hundred. They are not larger than those of a goose, and are covered with a tough white skin. She carefully fills up the hole before she leaves them. In each of the two succeeding days she lays as many more, which she hides in a similar manner. The eggs are hatched generally in about thirty days. The fetus of Crocodiles are rolled up within the egg, and at the time when the animals break the shell, they seldom exceed six or seven inches in length. They sometimes break the shell with their head, and sometimes with the

serrated tubercles of the back. On emerging into the air, they immediately run into the water, where multitudes of them are devoured by various kinds of fish, and even by the larger animals of their own species. It is, however, in the destruction of their eggs, that the most important service to mankind is effected. The ichneumon* and the vultures, (the latter of which, in hot climates, collect in immense numbers,) seem peculiarly appointed by Providence to abridge the enormous fecundity of the Crocodiles, and in this capacity they destroy and devour millions of their eggs.

The Crocodile, from its immense size and voracious habits, is doubtless an object of fear, and, by no very uncommon transition of sentiment, it has also gradually become an object of veneration; and offerings are in some countries made to it as to a deity. The inhabitants of Java, when attacked by disease, sometimes build a kind of coop, and fill it with such eatables as they think most agreeable to the Crocodiles. They place the coop upon the bank of a river or canal, in perfect confidence that, by such offerings, they shall be freed from their maladies; and in a full persuasion that, if any person could be so wicked as to take away those viands, such person would draw upon himself the malady, for the cure of which the offering was made. The worship of Crocodiles was indeed a folly among men of ancient date: Herodotus says, that "among some of the Egyptian tribes, the Crocodiles are held sacred, but that among others, they are regarded as enemies. The inhabitants in the environs of Thebes, and the Lake Mœris, are firmly persuaded of their sanctity; and both these tribes bring up and tame a Crocodile, adorning his ears with rings of precious stones and gold, and putting ornamental chains about his fore feet. They also regularly give him victuals, offer victims to him, and treat him in the most respectful

* *Viverra Ichneumon*, of Linnæus.

manner while living, and, when dead, embalm, and bury him in a consecrated coffin."

The king of Saba, on the slave-coast of Africa, has, at this day, two ponds always filled with Crocodiles. In the Rio San Domingo, likewise on the western coast of Africa, M. Brüe was astonished to find the Crocodiles (usually considered ferocious animals) perfectly harmless, insomuch that the children played with them, mounted on their backs, and even beat them, without danger, or any appearance of resentment. This gentleness of disposition, he says, proceeds from their being kept always full fed, and from the attention paid to them by the natives; for in all other parts of Africa, the Crocodiles attack indiscriminately men and animals.

The eggs, and the flesh of the Crocodile, particularly the flesh of the tail and belly, are used as food by the Negroes of Africa, and of several of the Indian nations. This flesh is white and juicy, and is considered by these people as peculiarly delicious. But such Europeans as have ventured to eat of it, have been, for the most part, disgusted by the strong musky flavour with which it is impregnated.

THE ALLIGATOR, OR AMERICAN CROCODILE*.

Alligators are natives of the warmer parts of America. It was by an accidental occurrence, that these inhabitants of the New World obtained their appellation. Had the first navigators seen any object that

* DESCRIPTION. The principal distinction betwixt the Alligator and the Crocodile, is, that the former has its head and part of the neck more smooth than the latter, and that the snout is considerably more wide and flat, as well as more rounded at the extremity. The length of the full-grown Alligator is seventeen or eighteen feet.

SYNONYMS. *Lacerta Alligator*. *Linnaeus*.—*Jacare*. *Marcgrave*. *Crocodile*. *La Hontan*.—*Lacertus Maximus*. *Catesby*.—*Shaw's Gen. Zool. vol. iii. tab. 59.*

more resembled their form than a lizard, they would probably have adopted the name by which the Indians call them, *Cayman*; but the Spanish sailors remarking their great resemblance to the lizard, they called the first of them which they saw, *Lagarto*, or Lizard. When our countrymen arrived in America, and heard that name, they called the creature *a-Lagarto*, whence was afterwards derived the word *Alligato*, or Alligator.

Alligators are often seen floating on the surface of the water like logs of wood, and are mistaken for such by various animals, which by this means they surprise, and draw underneath to devour at leisure. They are said also sometimes to form a hole in the bank of a river, below the surface of the water, and there to wait, till the fish, that are fatigued by the strong current, come into the smooth water to rest themselves, when they immediately seize and devour them. But, as they are not able to obtain a regular supply of food, from the fear in which they are held by all animals, and the care by which these, in general, avoid their haunts, they are able to sustain a privation of it for a great length of time. When killed and opened, stones and other hard substances are generally found in their stomach. In many that Mr. Catesby examined, there was nothing but mucilage and pieces of wood, some of which weighed seven or eight pounds each. The angles of these were so worn down, that he fancied they must have lain in the stomachs of the animals for several months. Two Alligators that Dr. Brickell saw killed in North Carolina, had in their bellies several sorts of snakes, and some pieces of wood; and in one of them was found a stone, that weighed about four pounds.

The voracity of these animals is so great, that they sometimes do not spare even mankind. A short time before M. Navarette was at the Manillas, he was told that, as a young woman was washing her feet in one of the rivers, an Alligator seized and carried her off. Her husband, to whom she had been but that morning married, hearing her screams, threw himself headlong

into the water, and, with a dagger in his hand, pursued the robber. He overtook, and fought the animal with such success, as to recover his wife: but, unfortunately for her brave rescuer, she died before she could be brought to the shore.

Where Alligators are very numerous, they will sometimes endeavour to get into the canoes or boats that pass their haunts during the night. M. de la Borde, at Cayenne, says, he has often seen them attempt to raise themselves against the sides of small boats in that river. He informs us also, that the Alligators which inhabit the lakes of South America, are sometimes left dry, in consequence of the water evaporating. In this case they subsist by catching birds or land animals, or even live a long time without food.

We are informed by Dampier, that the Alligators about the Bay of Campeachy, (probably from their having a full supply of food,) are by no means so ferocious as they are represented to be in other places. He never knew them attack a man, but he has often seen them run away from his sailors. He has drunk out of a pond full of them, where the water was not even deep enough to cover their backs; and the pond itself was so small, that he could get no water but by coming within two yards of an Alligator's nose, the animals lying all the while with their heads towards him. Dampier and some of his men were one day passing through a swamp, two or three feet deep in water, when they perceived the strong musky scent of an Alligator. Presently afterwards he stumbled over one of these animals and fell down. He called out loudly to his companions for assistance, but they ran off, as fast as their legs could carry them, towards the woods. He had no sooner recovered himself, than he stumbled over the animal a second, and afterwards a third time; but at last he got off in safety. This adventure had, however, such an effect upon him, that he never again went through any extensive water whilst he remained in the Bay of Campeachy.

Alligators deposit their eggs, like the crocodiles and turtles, at two or three different periods of the year, laying from twenty to about twenty-four at each time. It is said that those of Cayenne and Surinam raise a little hillock on the bank of the water, and, hollowing this out in the middle, amass together a heap of leaves and other vegetable refuse, in which they deposit their eggs. These being also covered with leaves, a fermentation ensues, by the heat of which, in addition to that of the atmosphere, the eggs are hatched. The animals generally lay their eggs in the month of April. Multitudes of the eggs are destroyed by vultures, and immense numbers of the young animals are devoured, as soon as they reach the water, by various species of fish.

It appears that the Alligator, when caught young, may, in some measure, be domesticated. Dr. Brickell saw one in a large pond before a planter's house. It remained there nearly half a year, during which time it was regularly fed with the entrails of fowls, and raw meat. It frequently came into the house, where it would remain for a short time, and then return again to its shelter in the pond. It is supposed at last to have stolen away to a creek near the plantation: for it was one day missing, and from that time was never afterwards seen.

The voice of these animals is very loud and dreadful. They have an unpleasant and powerful musky scent. M. Pagés says, that near one of the rivers in America, where the Alligators were numerous, their effluvia was so strong as to impregnate his provisions, and even to give them the nauseous taste of rotten musk. This effluvia proceeds chiefly from four glands, two of which are situated in the groin, near each thigh, and the other two at the breast, one under each fore-leg. Dampier informs us, that when his men killed an Alligator, they generally took out these glands, and, after having dried them, wore them in their hats by way of perfume.

The teeth of Alligators are as white as ivory; and snuff-boxes, chargers for guns, and several kinds of toys, are manufactured from them. The flesh of the young animals is said to be white, and tolerably palatable; but that of the old ones, although it is eaten by many of the American tribes, is, from its strong scent, extremely unpleasant to an European palate.

THE COMMON GUANA*.

The Guana feeds on insects and vegetables, and is an extremely gentle and harmless animal. Its appearance, however, is alarming, especially when agitated by fear or anger. Its eyes seem on fire; it hisses like a serpent, swells out the pouch under its throat, lashes about its long tail, erects the scales on its back, and holds its head, covered over with tubercles, in a menacing attitude. The usual places of its habitation or retreat, are the clefts of rocks, or the hollows of trees; and although it is not naturally resident in the water, yet, on necessity, it will continue immersed for a great length of time. In swimming it keeps its legs pressed close to its body, and urges itself forward by its tail.

It is quick in all its motions: it climbs into the trees, and even among the highest branches, with astonishing agility. Around these it will often entwine itself, concealing its head in some of the various foldings of its body.

The females are smaller than the males; their colours

* See Plate xi. Fig. 4.

DESCRIPTION. This animal grows to the length of four or five feet. The tail is long and round, the back serrated, and the crest denticulated. The individuals vary much in colour, but their prevailing tinge is brownish green. Under the chin they have a pouch capable of great inflation, and by which alone they are easily distinguished from other Lizards.

SYNONYMS. *Lacerta iguana.* Linn.—*L'Iguane.* *La Cépède.*—*Leguana.* Leba.—Great American Guana.—*Shaw's Gen. Zool.* vol. iii. tab. 61.

and proportions more agreeable, and their appearance is more gentle and pleasing. These usually quit the woods or mountains about two months after the end of winter, for the purpose of depositing their eggs in the sand of the sea-shore. The eggs are always unequal in number, from thirteen to twenty-five. They are longer, but not thicker than pigeon's eggs. The outer covering is white and flexible. Most travellers say, that these eggs give an excellent relish to sauces, and that their taste is preferable to that of poultry-eggs.

During the spring of the year, the male exhibits great attachment towards the female. He defends her even with fury, attacking, with undaunted courage, every animal that seems inclined to injure her; and at this time, though his bite is not poisonous, he fastens so firmly, that it is necessary either to kill him, or to beat him with great violence on the nose, to make him quit his hold.

The Guana cannot without difficulty be killed by blows, or even by wounds from fire-arms; but it dies almost instantaneously if even a straw be put up his nostrils. This occasions the flow of a few drops of blood, after which the animal expires.

The flesh of the Guana constitutes a principal food of the natives of the Bahama Islands, and of several parts of America, and this animal is hunted by dogs that are trained for the purpose. It is also sometimes ensnared by the following artifice, which has been described by Labat. "We were attended (he says) by a negro, who carried a long rod, at one end of which was fastened a piece of whipcord, with a running knot. After beating the bushes for some time, the negro discovered our game, basking in the sun, on the dry limb of a tree. He then began whistling with all his might: to which the Guana was wonderfully attentive, stretching out his neck, and turning his head, as if to enjoy it more fully. The negro now approached, still whistling: and advancing his rod gently, began tickling,

with the end of it, the sides and throat of the Guana, which seemed excessively pleased with the operation; for he turned on his back, and stretched himself out like a cat before the fire, and at length fell asleep. The negro perceiving this, dexterously slipped the noose over his head, and with a jerk brought him to the ground." Notwithstanding, however, the apparent stupidity and gentleness of the Guana, it no sooner finds itself ensnared, than it assumes a great degree of violence. It becomes extremely agitated; the pouch of its throat swells with rage, its eyes glisten, and it extends its wide jaws. But all its efforts are now useless; for the hunter, pressing it to the ground, with his whole strength, holds it fast, till he has tied his mouth and legs in such a manner, that it is no longer capable either of defence or flight. As soon as the animals are thus secured, their mouths are sewed up, to prevent them from biting; and some of them are carried alive from the Bahama Islands to Carolina for sale; others are salted and barrelled by the natives, for home consumption.

According to the account given by Dr. Brown, in his History of Jamaica, the flesh of the Guana, when properly dressed, is preferable to that of poultry. It is sometimes eaten roasted, but more commonly boiled, the fat being first taken out: this the natives melt and clarify for various uses. It is a singular fact, that the fat of the abdomen always assumes the colour of the food which the animal has last eaten.

These animals, if caught when young, may easily be domesticated. Dr. Brown had a full-grown Guana about his house more than two months: for some days it continued to indicate symptoms of great ferocity; but at last it grew so tame, that it would pass the greatest part of the day upon his bed or couch. It was always suffered to go out at night. As it walked it frequently threw out its long forked tongue; but Dr. Browne says, that during all the time he had it, he never observed that it ate any thing.

The Guana is found in many parts both of Africa and Asia, and is a very common animal in Surinam, in the woods of Guiana, in Cayenne and Mexico; but it is now become scarce in the West Indies, in consequence of its being there much sought after for the table.

THE NIMBLE LIZARD*.

This elegant little animal, which is known in almost every part of the temperate regions of Europe, seems to be the most gentle and inoffensive of all the Lizard tribe. It is fond of basking in the sun; but, unable to bear excessive heat, in the hottest weather it seeks for shelter. In spring, during fine weather, it may sometimes be seen extended on a sloping green bank, or on a wall exposed to the sun. In these situations it enjoys the full effects of the reviving warmth; it expresses its delight by gently agitating its slender tail, and its lively and brilliant eyes are animated with pleasure. Should any of the minute animals, on which it feeds, appear, it springs upon them with the quickness of thought; and if any danger occurs, the little creature itself escapes into some place of retreat with equal rapidity. On the least noise it turns suddenly round, drops down, and seems, for a moment, stupified by its fall: or else it suddenly shoots away among the bushes or thick grass. Its great rapidity of motion is chiefly

* **DESCRIPTION.** The nimble Lizard, one of the British species, measures in length, from the tip of the nose to the end of the tail, about six inches and a half. The upper part of the head is light brown, and the back and tail are variously striped and spotted with light brown, black, white, and dark brown. The under parts of the body are of a dirty white colour.

SYNONYMS. *Iacerta agilis.* *Linnaeus.*—Le Lizard gris. *La Cope.*—Little Brown Lizard. *Edwards.*—Scaly Lizard. *Penn.*—*Penn. Brit. Zool.* vol. iii. tab. 2.

to be observed in warm countries, for in the temperate regions its evolutions are much more languid.

This gentle and peaceful animal excites no sensations of terror; and when taken into the hand, makes not the least attempt either to bite or offend. In some countries, children use it as a play-thing; and, in consequence of its natural gentleness of disposition, it becomes, in a great measure, tame and familiar.

The tail is nearly twice the length of the body, and tapers from the root to the extremity, where it ends in a sharp point. This, from the weakness of the vertebræ, is so brittle as often to snap off on the least roughness in handling. In this case, however, it is sometimes reproduced. When the tail has been split or divided lengthways, each of the portions, in healing, has rounded itself, and thus the animal has had a double tail. One of these has contained the vertebræ, and the other only a kind of tendon in the centre.

For the purpose of seizing the insects on which it feeds, the Nimble Lizard darts out, with astonishing velocity, its forked tongue. This is of a reddish colour, and is beset with asperities which are scarcely sensible to the sight, but which are of great use in catching its winged prey. Like most other oviparous quadrupeds, this Lizard is capable of existing for a long time without food. Some of these animals have been kept in bottles, without nourishment, for upwards of six months.

In the beginning of May, the female deposits her eggs, which are nearly spherical, and about five lines in diameter, in some warm situation; as, for instance, at the foot of a wall fronting the south. Here they are hatched by the heat of the sun.

Previously to the breeding-season, both the male and female change their skins, and this they again do about the beginning of winter. They pass that season in a state of torpor, more or less complete, according to the rigour of the climate, either in holes of trees, in walls, or in subterraneous places.

This little animal seems occasionally to lay aside its natural gentleness of disposition, but no further than for the purpose of obtaining food. Mr. Edwards once surprised a Nimble Lizard in the act of fighting with a small bird, as she sat on her nest in a vine against the wall, with newly-hatched young. He supposed that the Lizard would have made a prey of the latter, could he but have driven the old bird from her nest. He watched the contest for some time: but, on his near approach, the Lizard dropped to the ground, and the bird flew off.

THE GREEN LIZARD*.

This beautiful animal is found in various situations, in gardens, about warm walls, sunny banks, and old buildings, throughout all the warmer parts of Europe; and although it is not found in our own country, it seems generally dispersed over the Continent.

In its manners it is as gentle as the Nimble Lizard; and if taken young may, to a certain degree, be tamed. On this account, and from its extremely beautiful appearance, it is in general a favourite animal. In Sweden and Kamtschatka, however, it is looked upon by the inhabitants with horror. The Kamtschadales con-

* **DESCRIPTION.** The Green Lizard, and the Nimble Lizard, are considered by Dr. Shaw as varieties of the same species. The latter, however, sometimes attains a considerable size, measuring two feet or upwards in length, although its general length is not more than fifteen inches. Its colours are more brilliant and beautiful than those of any other European Lizard: they exhibit a rich and varied mixture of darker and lighter green, interspersed with specks and marks of yellow, brown, blackish, and sometimes even red. The head is covered with large angular scales; and the rest of the upper parts with very small ones. The tail is generally much longer than the body. Beneath the throat there is a kind of collar, formed by scales of much darker colour than the rest of the body.

SYNONYMS. Lezard Vert. *La Cépède*. — Stellion, in Italy.

sider it as sent by the infernal deities, and are anxious to cut it to pieces whenever they meet with it.

Notwithstanding the generally peaceful disposition of the Green Lizards, they may easily be excited to fight, and they then bite each other with fury. They sometimes contend with serpents, but generally fall a victim to the unequal combat. When this animal observes the approach of a serpent, it is extremely agitated, and runs about apparently with great fear. Some persons, inclined to interpret every thing favourably in the character of so beautiful a creature, have considered these indications of fear as marks of attention and of attachment to mankind; as if the animal meant thereby, to give them notice of the dangerous presence of the serpent.

When driven to extremity, the Green Lizard will sometimes defend itself even against the attacks of dogs. It springs instantly at the muzzle of the assailant, and often fixes itself so obstinately, that it will allow itself to be carried off, and even killed, rather than quit its hold.

It feeds principally on insects and earth-worms; and is, in every respect, a most active animal, pursuing, with wonderful celerity, its insect prey, and when disturbed, escaping with great readiness from pursuit. It devours the eggs of small birds, for which purpose it climbs with agility into the highest branches of trees.

It runs with great swiftness; and its first motions, when it springs from among bushes or dry leaves, are often so rapid, as to excite sensations of surprise, or even of fear.

THE GREEN LIZARD OF CAROLINA*.

These are very useful animals about the houses in Carolina: they destroy immense numbers of flies, and

* * Dr. Shaw describes this as a variety of *Lacerta bullaris*, of Linnæus; and La Cépède, of *Lacerta agilis*. It seldom exceeds the length of five inches. The general colour is bright green; some of the individuals appearing as if they were adorned with gold and silver, while others are of a fine golden green.

other troublesome and noxious insects. It is scarcely credible with what industry, agility, and dexterity, they lie in ambush for, follow, and seize their prey. They will sometimes remain motionless for half a day, waiting for the insects on which they feed; and, when one appears, they spring at it with the swiftness of an arrow. So familiar are they, that they enter houses without fear, and, in pursuit of insects, they mount the tables whilst people are eating. They are so cleanly and so beautiful, that they are suffered to run over the tables, and even upon the plates, without exciting the smallest disgust.

This little animal has every quality that can delight the eye, or interest the beholder in its favour. It is beautiful, active, useful, patient, and industrious: it is extremely delicate, and never appears abroad except during the summer season, at least in latitudes even but little distant from the Tropics. On the approach of cold weather it seeks for safety in the hollows or crevices of decayed trees, where it lies in a torpid state through the winter.

The skin of these Lizards is so delicate as scarcely to conceal the internal changes to which they are subject; for they change colour, like the chameleon, according to the state of their health, or perhaps more properly speaking, according to the temperature of the atmosphere. In a hot day they are usually of a green colour; but if, on the day following, the weather become chill, the same animals will often appear quite brown.

The freshness and brilliancy of colour in this Lizard entirely disappear after death, when its skin becomes pale and livid.

The female deposits in the earth her eggs, each of which is about the size of a pea. She covers them slightly over, and leaves them to be hatched by the heat of the sun.

THE CHAMELEON*.

Not many animals of the present class have attained greater celebrity than the Chameleon. From the earliest periods, this extraordinary reptile has been metaphorically employed to denote the most abject flattery. It has been considered as always deriving its colour from the object on which it was placed, and as having no colour of its own. In this creature thus accommodating itself to present circumstances, mankind beheld a striking representation of the generality of courtiers. They therefore employed it as a subject of comparison for those cringing persons who, having no opinion of their own, bend themselves into every possible form, and feed themselves only with fruitless and vain expectations; for the Chameleon also was believed to live only on air. This last notion, however, is not correct; and it seems to have arisen merely from the circumstance of these animals, like all others of their class, being able to subsist for a great length of time without food.

The Chameleon is a native of India, the Indian Islands, Africa, and some of the warmer parts of Spain and Portugal, as well as of several of the countries of South America. Its usual length is about ten inches; and that of the tail is nearly the same.

Though an animal extremely ugly and disgusting in its appearance, it is perfect harmless. It feeds only on insects, for which the structure of its tongue is peculiarly adapted, being long and missile, and furnished with a dilated, glutinous, and somewhat tubular tip. By means of this it seizes upon insects with the greatest ease, darting it out, and instantaneously retracting it, with the prey secured on its tip, which it swallows whole. The skin is covered with small warts or gra-

* See Plate xiv. Fig. 5.

SYNONYMS. *Lacerta Chamæleon*. Linn.—*Le Caméleon*. *La Cepede*.—*Shaw's Gen. Zool.* vol. iii. tab. 76.

nulations, each about the size of a tolerably large pin's head ; and along the middle of the back, there is a row of serratures.

All the motions of this creature are extremely slow : in travelling from one branch of a tree to another, and in taking food, it may rather be said to lie in ambush among the leaves, in order to catch such insects as may alight upon, or come within the reach of its long adhesive tongue, than to go in search of prey. Its feet have each five toes, which are situated three one way and two another, in order to enable it to lay firmly hold of the branches: but, whenever it happens that these are too large for the animal to grasp them with its feet, it coils round them its long, prehensile tail, and fixes its claws strongly into the bark. When walking on the ground it steps forward in an extremely cautious manner, seeming never to lift one foot, until it is well assured of the firmness of the rest. From these precautions, its motions have a ridiculous appearance of gravity, when contrasted with the smallness of its size, and the activity that one might expect in an animal so nearly allied to some of the most active in the creation.

The eyes of the Chameleon are each covered by a rough membrane, in appearance not much unlike shagreen, which is attached to the eye-ball, and follows all its motions. This membrane is divided by a narrow, horizontal slit, through which the bright pupil, as if bordered with burnished gold, is seen. This wonderful structure resembles, in some degree, the artificial defence employed by the Laplanders and other northern nations, for defending their eyes against the excessive reflection of light from the surface of the snow, by means of a narrow slit, in a thin and hollow piece of wood. The eyes of the Chameleon have another singular property, that of looking at the same instant in different directions. One of them may frequently be seen to move when the other is at rest ; or one will be directed forward, whilst the other is attending to some object behind ; or in a similar manner upward and downward.

The Chameleon has likewise a power of inflating most parts of its body, so as to increase its general bulk, and to give a full and round appearance to such parts as are naturally flaccid and lank. This inflation is produced by slow and irregular efforts; and proceeds occasionally to such a degree, as to double the usual size of the animal, extending even into the feet and tail. The inflation continues sometimes during two or three hours, lessening a little now and then, and again increasing; the diminution being always slower in its progress than in its increase. The Chameleon is often for a great while together entirely flaccid; and it has then so complete an appearance of leanness, that the ribs, the vertebræ of the back, and all the tendons of its legs, may very distinctly be seen. In this state, especially when it turns round, it seems a mere animated skin, enclosing a few bones. This property of inflation is, however, not entirely confined to the Chameleon. It is possessed, though in a much less degree, by almost all other oviparous quadrupeds, but particularly by the frogs; and it has been supposed to depend on a power which the animals have of causing the air to pass from their lungs, into the interstices betwixt the skin and muscles. Its peculiar use in the animal economy has not been satisfactorily explained. The lungs are composed of several distinct vesicles, which, when fully distended, cover almost the whole viscera; whilst, on the contrary, they are so extremely small when flaccid, that many of their vesicles escape notice. This circumstance explains the cause of some writers having described them as large, whilst others have represented them as being peculiarly minute.

With respect to the singular operation of the Chameleon changing its colour, I shall present the reader with the accounts of three persons, who state themselves to have been several times witness to it. There appears a considerable difference in these accounts, which he must reconcile as well as he is able. The writers I allude to are D'Obsonville, Hasselquist, and Dr. Russel.

The colour of the Chameleon, says M. D'Obsonville, is naturally green; but it is susceptible of many shades, and particularly of three very distinct ones: Saxon green, deep green, and a shade bordering on blue and yellow green. When free, in health, and at ease, it is of a beautiful green; some parts excepted, where the skin, being thicker and more rough, produces gradations of brown, red, or light gray. When the animal is provoked, in open air, and well fed, it becomes blue green; but when feeble, or deprived of free air, the prevailing tint is yellow-green. Under other circumstances, and especially at the approach of one of its own species, no matter of which sex, or when surrounded and teased by a number of insects thrown upon him, he then, almost in a moment, takes alternately the three different tints of green. If he be dying, particularly of hunger, the yellow is at first predominant; but in the first stage of putrefaction this changes to the colour of dead leaves.

The causes of these changes are various: and first, the blood of the Chameleon is of a violet blue, which colour it will preserve for some minutes on linen or paper, especially on such as have been steeped in alum-water. In the second place, the different tunics of the vessels are yellow, as well in their trunks as in their ramifications. The epidermis, or exterior skin, when separated, is transparent, without any colour; and the second skin is yellow, as are all the little vessels that touch it. Hence it is probable that the change of colour depends upon the mixtures of blue and yellow, from which result different shades of green. Thus, when the animal, healthy and well fed, is provoked, its blood is carried in greater abundance from the heart towards the extremities; and swelling the vessels that are spread over the skin, its blue colour subsides, and, with the yellow of the vessels, produces a blue green that is seen through the epidermis. When, on the contrary, the animal is impoverished and deprived of free air, the exterior vessels being more empty, their colour prevails, and the animal becomes of a yellow-green till

it recovers its liberty, is well nourished, and without pain, when it regains its former colour; this being the consequence of an equilibrium in the liquids, and of a due proportion of them in the vessels.

Hasselquist says, that he never observed the Chameleon assume the colour of an external object presented to its view, although he made several experiments for the purpose. He says that its natural colour is an iron gray, or black, mixed with a little gray. This it sometimes changes, and it becomes entirely of a brimstone yellow, which, except the former, is the colour it most frequently assumes. It sometimes takes a darker or greenish yellow, and sometimes a lighter. He did not observe it assume any other colours; such as blue, red, purple, &c. When changing from black to yellow, the soles of its feet, its head, and the bag under its throat, were the first tinged; and then, by degrees, that colour spread over the rest of the body. He several times saw it marked with large spots of both colours all over its body, which gave it an elegant appearance. When it became of an iron gray, it dilated its skin, and became plump and handsome; but as soon as it turned yellow, it contracted itself, and appeared empty, lean, and ugly: and the nearer it approached in colour to white, the more empty and ugly it appeared; but its shape was always the most unpleasant when it was speckled. Mr. Hasselquist kept a Chameleon for nearly a month. During the whole time it was very lively, climbing up and down its cage, fond of being near the light, and constantly rolling about its large eyes. It took no food during the whole of this time; so that it became lean, and evidently suffered from hunger. At length, through weakness, it fell from its cage upon the floor, when a turtle, that was in the same room, bit it and hastened its death.

When the Chameleon is removed from its place, Dr. Russel informs us that it does not immediately change colour, nor does it constantly, in changing, assume that of the ground upon which it is laid. Thus,

if put into a box lined with white, or with black, it will sometimes in the black become of a lighter colour than before, and *vice versa*; and sometimes will assume a brimstone colour. When the experiment was made upon a cloth of various colours, but where the animal had a larger field to move about upon, the event was the same. It frequently goes through a succession of colours before it takes that of the body nearest to it. When laid on the grass it will, perhaps, from a light earthy colour, first become darker, then black, yellow, again darkish, and, last of all, green. At other times it becomes green at once; and so of other colours when laid on other grounds: whence it has been hastily conjectured that the transition was always sudden. But, notwithstanding this irregularity in its change, especially when hurried or disturbed, its most permanent colour, in repose, was that of the ground on which it lay; provided the ground was not one of the colours that it never does assume, of red or blue. Little difference was observable, whether the experiments were made in the shade or in the sun; but the animal appears duller at some times than others, and captivity seems to abate its alacrity in changing.

Mr. Barrow says, that “previously to the Chameleon’s assuming a change of colour it makes a long inspiration, the body swelling out to twice its usual size: and as this inflation subsides, the change of colour gradually takes place. The only permanent marks are two small dark lines passing along the sides.

The Chameleon retires, in cold weather, into holes of rocks, and other retreats, where it is supposed to become torpid, till the return of the warmth restores the languid energy of its functions. The female not long afterwards, emerges from this confinement, and lays from nine to twelve eggs. These are oval, and seven or eight lines in their greatest diameter. They are covered with a soft parchment-like membrane.

THE SALAMANDER

No animal of the present tribe, except the crocodile, has excited so much notice as the Salamander. Whilst even the hardest bodies are unable to resist the action of fire, the generality of mankind have given credit to the absurd stories, that have for ages been circulated, of this little Lizard not only being able to withstand the effects of this powerful element, but even to extinguish it. So small an animal, possessing such superior privileges, that furnished so many objects of comparison to poetry, so many beautiful emblems to love, and so many brilliant devices to valour, seems to have laid hold on the imaginations of men, in such a manner that they were unwilling to retract their belief, and therefore contented themselves with the traditions, without having their curiosity sufficiently roused to satisfy themselves by immediate experiment. The ancients, pretending that it owed its existence to the purest of elements, called it the Daughter of Fire, giving to it, at the same time, a body of ice. The moderns adopted the absurd tales of the ancients; and, as it is difficult to stop when once the bounds of probability have been passed, some writers have asserted that the most violent fire could be extinguished by the Salamander. In the most raging conflagration, it has been stated, that if one of these small Lizards were but thrown into the flame, its progress would immediately be checked. It was not until after the light of science was diffused abroad, that the world

* **DESCRIPTION.** The general length of the Salamander is seven or eight inches, though sometimes it becomes much larger. This animal is easily distinguished from all other Lizards by its short, cylindrical tail, and deep shining black colour, variegated with large oblong and somewhat irregular patches of bright orange-yellow.

It is found in shady woods, in many parts of Germany, Italy, and France.

SYNONYMS. *Lacerta salamandra.* *Linnaeus.*—*La Salamandre terrestre.* *La Cécile.*—*Shaw's Gen. Zool. vol. iii. tab. 82.*

began to discredit this wonderful property. Experiment then proved what reason alone might, long before, have demonstrated.

In addition to this, the Salamander was erroneously considered a poisonous reptile, and has been generally held in terror. M. de Maupertuis, who minutely studied the nature of this Lizard, in order to discover what might be its pretended poison, demonstrated experimentally, that fire acted upon it in the same manner as upon all other animals. He remarked, that it had scarcely been placed upon the fire, before it appeared to be covered with drops of a milky fluid, which oozed through all the pores of the skin, and immediately became hard. This fluid, however, was not sufficiently abundant to extinguish even the smallest fire. It possessed some degree of acridity; for, when put upon the end of the tongue, it caused an unpleasant burning sensation.

Shady woods, high mountains, or the banks of unfrequented rivulets, are the usual retreats of these animals; and they are not often seen except during wet weather. In winter they lie concealed in hollows about the roots of old trees, in subterraneous recesses, or the cavities of old walls, where several of them have sometimes been discovered, collected and twisted together. They are frequently to be seen in the water, where they are able to live as on land. Their principal food consists of insects, snails, and worms. Their pace is slow, and their manners sluggish.

When the Salamander is at rest, it often rolls itself into a spiral form like a serpent. Whenever it is handled, it covers itself suddenly over with its milky fluid; and when crushed, or even when squeezed, it emits a peculiar and offensive odour. When struck, it erects its tail, and becomes, for some time, altogether motionless.

It is extremely tenacious of life, and is not to be killed by blows or wounds without difficulty; but if wetted with vinegar, or sprinkled with powdered salt, it soon dies in convulsions. This is likewise the case

with some other Lizards, and with most worms. It is able to continue under water for a considerable length of time. Some individuals have been kept in water for more than six months, without any other food than what they could collect from that element. The animals often raise their nostrils above the surface, for the purpose of breathing. Whilst kept in water, they occasionally throw off a thin skin, or pellicle, of a greenish ash-colour.

The females are generally supposed to produce their young-ones into the world alive, hatched from eggs within their own bodies, in the same manner as vipers. M. de Maupertuis, in one female that he opened, counted forty-two, and in another forty-four. When first hatched, the young Salamanders are nearly black, and almost without any yellow spots. They are deposited in the water, and are furnished with a kind of fins on each side of the neck, which always drop off as soon as the animals become perfect.

THE WATER EFT, OR NEWT*.

To the Salamander has been attributed the fabulous property of being able to live in the midst of fire; whilst, on the contrary, the Eft has been discovered really to possess the opposite quality, of preserving its existence in the midst of ice. It is sometimes caught

* DESCRIPTION. This Lizard, which is very common in stagnant and muddy waters in this country, is six or seven inches in length, and is entirely covered, except on the belly, with small warts. The under parts are of a bright yellow colour, and the upper mostly black brown, spotted with black. It resides altogether either in the water, or in very damp places; and its tail, being flattened perpendicularly, serves it as a rudder in swimming. It is usually seen crawling along the bottom, but it now and then rises, with a wriggling motion, to the surface.

SYNONYMS. *Lacerta palustris.* *Linnaeus.*—La Salamandre à queue plate. *Le Cepede.*—Ask, in Scotland.—Warty Lizard, Penn.

by the sudden formation of ice in the ditches or ponds that it inhabits; here it remains in a torpid state, till, at the return of spring, its prison becomes melted, when it recovers its liberty, and its powers of motion. Sometimes, even in summer, Efts have been found enveloped in lumps of ice taken from ice-houses; and in these they must have remained without either food or motion, from the commencement of the frost.

The inhabitants of Lapland, and several other countries of the north of Europe, have many fabulous notions respecting this animal. They say, for instance, that although it usually lives in the water, yet it often bounds up from the surface of the water, and alights on the branch of some adjacent tree, where it makes a noise resembling that of a man laughing.

The female deposits her eggs towards the end of May, or the beginning of June. These are very numerous, and are connected together in two strings, by a viscid substance, which likewise surrounds each single egg. They are deposited at the bottom of the water, but they sometimes rise for a little while to the surface, in consequence of some globules of air which form in the glairy matter that surrounds them: that air, however, soon escapes, and they again sink. The young Efts may be distinctly perceived through this glairy matter, coiled up within a transparent membrane. These gradually increase in size, and soon begin to move, at first slowly, but afterwards with greater agility. After eight or ten days, according to the climate or season, they tear themselves a passage through the membrane. When the young ones first come into the world, they have somewhat the structure of fishes: the feet are short, and the shoulders are furnished with a kind of small fringed fins. These appear not much unlike feathers, and are attached to a kind of notched cartilaginous half rings, usually about four on each side. As the animals become larger, these processes diminish in size, and at last disappear.

Almost all the animals of the lizard tribe, change

their skins once or twice a year, but the Efts do this much more frequently. From seven individuals that Mr. Baker kept in a large jar of water for many months, it appears, that they generally perform this operation at the end of every fortnight or three weeks. He informs us, that for a day or two before the change, the animal always appeared more inactive than usual, taking no notice of the worms that were given to it, which at other times it greedily devoured. The skin in some parts of the body appeared loose, and in colour not so lively as before. The animal began the operation of casting its skin, by loosening that part about the jaws. It then pushed it backward gently and gradually, both above and below the head, till it was able to slip out first one leg and then the other. With these legs it proceeded to thrust the skin as far backward as they could reach. This done, it was under the necessity of rubbing its body against the gravel at the bottom of the water, till it was more than half freed from the skin, which appeared doubled back, covering the hinder part of the body and the tail. The animal now bent back its head, taking the skin in his mouth : and then set its feet upon it, and by degrees drew it entirely off, the hind-legs being dragged out in the same manner that the others had been before. On examining the skin, it was, in every instance, found to be turned inside out, but without any breach except at the jaws. These creatures do not, however, like some of the snakes, put off the coverings of the eyes along with the skin ; for two round holes always appear where the eyes have been. This operation sometimes occupies nearly half an hour ; and, after it is finished, the lizard appears in full vigour. If the skin be not taken away very shortly after it is cast, the animal usually swallows it. Sometimes it begins with the head part first ; and the tail, being filled with air and water, becomes like a blown bladder, and proves so unmanageable, that it is very diverting to see the pains it costs to discharge these, and to reduce it to a condition to pass down the throat.

M. Dufay informs us, that it frequently happens to an Eft, not to be able to get the old skin entirely removed from one of the feet; and that the portion of the skin which remains, becoming corrupted, often occasions a species of gangrene in the foot. This foot soon afterwards falls off; but instead of killing the animal, it is in a little while replaced by another. Efts are still more liable to lose their toes in this manner. The cast skins of Efts are frequently to be seen floating on the surface of stagnant waters.

The teeth of these animals are so small, as scarcely to be perceptible. They feed on flies and various other insects, on the spawn of frogs, and on the vegetables of marshes, ponds, and ditches. They will frequently snap at the angler's bait, and are thus often caught by his hook. Dr. Townson, who kept several of these Lizards in a jar, for the purpose of trying experiments on their respiration, says, that he fed them with worms. If they were in the greatest stillness, and a worm was dropped ever so gently among them, they all immediately began to fight, each attacking his neighbour, and seizing it by the head, foot, or tail. This he remarked to be not a contention immediately for the worm, for that often lay for a short time unnoticed, but it seemed to originate in a great acuteness of smell, (which in a moment informed them of the presence of their food,) and in a singular dulness of their discriminating powers, which did not enable them to observe exactly where it was deposited.

From the circumstance of this species of Lizards having never been seen in the winter, it is supposed that they retire into holes or mud, in their native ponds or marshes, and there become torpid.

It has been satisfactorily ascertained, by various experiments, that the Eft has no venomous qualities whatever.

Serpents*.

OF THE RATTLE-SNAKE TRIBE†.

The animals of this tribe, which are few in number, are all furnished with poisonous fangs; but their bite is not fatal, unless they be much irritated. They are confined to the warmer parts of America, where they prey on the smaller species of birds, lizards, and insects. They give notice of their approach by the rattle at the extremity of their tail: this rattle is composed of hollow, membranaceous articulations, that annually increase in number till they amount to about forty. The head is broad, and covered with large carinated scales, or such as have a prominent middle line; the snout is rounded and obtuse.

THE BANDED RATTLE-SNAKE‡.

This, the most dreaded of all serpents, is found both

* *Serpents* are destitute of feet. Their jaws are dilatable, and not articulated: they have neither fins nor ears.

† The Linnean generic character of the Rattle-snakes is, that they have scuta, or shields, on the abdomen; scuta and squamæ, or both shields and scales, beneath the tail; and the tail terminated with a rattle.

‡ **DESCRIPTION.** The Banded Rattle-snake grows to the length of five or six feet. Its colour is yellowish-brown above, marked with broad transverse bars of black. Both the jaws are furnished with small, sharp teeth, and the upper one has four large incurvated and pointed fangs. At the base of each fang there is a round orifice, opening into a hollow, which again appears near the end of the tooth, in the form of a small channel: these teeth may be raised or compressed. When the animals are in the act of biting, they force, out of a gland near the roots of the teeth, the fatal juice: this is received into the round orifice of the teeth, and conveyed through the tube into

in North and South America. Providence has given to mankind a security against its bite; for it generally warns the passenger of its vicinity by the rattling of its tail. In fine weather the notice is always given, but not always in rainy weather: this inspires the Indians with a dread of travelling among the woods in wet seasons. In addition to this circumstance, the odour of the Rattle-snake is so extremely fetid, that, when it basks in the sun, or is irritated, it is often discovered by the scent, before it is either seen or heard.

The Rattle-snake usually moves with its head on the ground; but, if alarmed, it throws its body into a circle, coiling itself with its head in the centre erect, and with its eyes flaming in a most terrific manner. Happily, it may easily be avoided: it is slow in pursuit, and has not the power of springing at its assailants.

Its tongue is frequently darted out and retracted with great agility. Besides the fangs with which Rattle-snakes kill their prey, there is another kind of teeth much smaller, and situated in both jaws: these serve for catching and retaining it. There are no grinders: for Rattle-snakes do not chew their food, but always swallow it whole.

It is not very unusual for this creature to come into houses; but the moment any of the domestic animals see or hear it, they take alarm, and unite in giving notice of its presence. Hogs, dogs, and poultry, all exhibit the utmost consternation and terror, erecting their bristles or feathers, and expressing, by their different notes of alarm, that a dangerous enemy is near. Mr. Catesby says, that in a gentleman's house in Carolina, as the servant was making the bed, on the ground-floor, which he had himself left but a few minutes before, he

the channel. Their tail is composed of hollow, membranaceous articulations, which annually increase in number, till they amount to about forty.

SYNONYMS. *Crotalus horridus.* *Linnaeus.*—*Boiquira.* *La Cepede.*

discovered a Rattle-snake lying coiled between the sheets in the middle of the bed.

When the Rattle-snake has been irritated, or the weather is exceedingly hot, its poison, on being inserted into a wound, often proves fatal in a very short time.

We are told, by an intelligent American writer, that a farmer was one day mowing with his negroes, when he accidentally trod on a Rattle-snake, that immediately turned upon him, and bit his boot. At night, when he went to bed, he was attacked with sickness : he swelled, and, before a physician could be called in, he died. All his neighbours were surprised at this sudden death, but the body was interred without examination. A few days afterwards, one of the sons put on his father's boots, and, at night, when he pulled them off, he was seized with the same symptoms, and died on the following morning. The medical man arrived, but, unable to divine the cause of so singular a disorder, he seriously pronounced both the father and the son to have been bewitched. At the sale of the effects, a neighbour purchased the boots, and on putting them on, experienced the like dreadful symptoms with the father and son. A skilful physician, however, who had heard of the preceding affair, being sent for, he suspected the cause, and, by applying proper remedies, recovered his patient. The fatal boots were now carefully examined, and the two fangs of the snake were discovered to have been left in the leather, with the poison bladders adhering to them. They had penetrated entirely through, and both the father and son had imperceptibly scratched themselves with their points in pulling off the boots.

Dr. Brickell says, he was witness to an encounter between a dog, and a Rattle-snake which was fastened to the ground by a tolerably long string. The snake coiled up, and rattled its tail; and the dog being let loose, seized and attempted to shake it out at full length, but from the weight was prevented from doing

this, and in consequence the animal bit him in the ear. He seemed somewhat stunned, and left the place, but returned on being encouraged by the company. In the second encounter he received a bite in his lip, after which the Snake bit himself. The dog from that moment appeared senseless of every thing around him; even the caresses of his brutal master had now no effect, and in less than half an hour both the animals were found dead.

If not provoked, these animals are perfectly inoffensive to mankind, being so much alarmed at the sight of men, as always, if possible, to avoid them, and never themselves commencing an attack.

Mr. St. John once saw a tamed Rattle-snake, as gentle as it is possible to imagine a reptile to be. It went to the water and swam whenever it pleased; and when the boys to whom it belonged called it back, their summons was readily obeyed. It had been deprived of its fangs. They often stroked it with a soft brush; and this friction seemed to cause the most pleasing sensations, for it would turn on its back to enjoy it, as a cat does before the fire.

Rattle-snakes are viviparous, producing their offspring, generally about twelve in number, in the month of June; and by September these acquire the length of twelve inches. It has been well attested that they adopt the same mode of preserving their young-ones from danger as that attributed to the European viper, receiving them into their mouth and swallowing them. M. de Beauvois declares that he was an eye-witness to the process. He saw a large Rattle-snake, which he had disturbed in his walks: it immediately coiled itself up, opened its jaws, and in an instant five small ones that were lying by it, rushed into its mouth. He retired in order to watch the snake, and in a quarter of an hour saw her again discharge them. He then approached a second time, when the young-ones rushed into its mouth more quickly than before, and the animal immediately moved off and escaped.

The Rattle-snake is known to devour several of the smaller species of animals, and, by many persons, is considered to be endowed with the power of fascinating its prey, until they even run into its jaws. Professor Kalm states, that this snake will frequently lie at the bottom of a tree on which a squirrel is seated. He fixes his eyes upon the little animal, and from that moment it cannot escape: it begins a doleful outcry; runs up the tree a little way, comes down again, then goes up, and afterwards comes still lower. The snake continues at the bottom of the tree, with its eyes fixed on the squirrel; and his attention is so entirely taken up, that a person accidentally approaching may make a considerable noise, without so much as the snake's turning about. The squirrel comes lower, and at last leaps down to the snake, whose mouth is already wide open for its reception. The little animal then with a piteous cry, runs into his jaws, and is swallowed.

Some colour is given to this account by M. Le Vaillant, who says that he saw, on the branch of a tree, a species of shrike, trembling as if in convulsions; and at the distance of nearly four feet, on another branch, he beheld a large species of snake, that was lying with out-stretched neck, and fiery eyes, gazing steadily at the poor animal. The agony of the bird was so great, that it was deprived of the power of moving away; and when one of the party killed the snake, the shrike was found dead upon the spot, and that entirely from fear; for on examination it appeared not to have received the slightest wound. The same traveller informs us, that a short time afterwards he observed a small mouse, in similar agonizing convulsions, about two yards distant from a snake, whose eyes were intently fixed upon it; and on frightening away the reptile, and taking up the mouse, it expired in his hand.

Dr. Barton of Philadelphia, however, after having examined, with some care, into the subject, is of opinion that the report of this fascinating property has had its rise in the fears and cries of birds, and other animals,

in the protection of their nests and young. He says that "the result of not a little attention has taught him, that there is but one wonder in the business ;—the wonder that the story should ever have been believed by any man of understanding and observation." But the above facts, if they be such, and, till they are proved otherwise, we must esteem them such, apply so ill to Dr. Barton's conclusion, as to induce a supposition that his opinion is not so well founded as it might appear to be from the perusal of his paper only, and without comparing it with other accounts. *

In summer the Rattle-snakes are generally found in pairs: in winter they collect in multitudes, and retire into the ground, beyond the reach of the frost. Tempted by the warmth of a spring day, they are often observed to creep out in a weak and languid state. Mr. Pennant mentions, that a person has seen a large piece of ground covered with them, and that he killed, with a rod, between sixty and seventy; till, overpowered with the stench, he was compelled to retire.

The American Indians often regale on the Rattle-snake. When they find these animals asleep, they put a small forked stick over their necks, which they keep immovably fixed to the ground, giving the snake a piece of leather to bite; and this they pull back several times with great force, till they observe that the poisonous fangs are torn out. They then cut off the head, skin the body, and cook it as we do eels; and the flesh is said to be extremely white and good.

OF THE BOA TRIBE IN GENERAL.*

This is a noble tribe of animals, the largest and

* The Boas are easily distinguished from other serpents, in the under surface of the tail being covered with scuta or undivided plates, like those on the belly, and in their body not being terminated by a rattle.

strongest of the serpent race. They are destitute of venom, never attack but from necessity, always engage with open courage, and conquer only by superior strength.

Three of the species are found in Asia; the rest are confined to the warmer parts of the New Continent.

THE GREAT BOA^{*}

This immense animal, the largest of all the serpent tribe, is frequently from thirty to forty feet in length, and of proportionate thickness. A gentleman, who had some extensive mercantile concerns in America, informs us, that he one day sent out a soldier, with an Indian, to kill some wild-fowl; and in pursuing their game, the Indian, who generally went before, sat down upon what he supposed to be the fallen trunk of a tree. But the monster beginning to move, the poor fellow perceived what it was that he had thus approached, and dropped down in an agony. The soldier, who at some distance saw what had happened, levelled his piece at the serpent's head, and shot it dead; then, going up to the relief of his companion, found that he was also dead from the fright. On his return, he related what had happened; the animal was ordered to be brought, and it was found to be thirty-six feet long. The skin

^{*} See Plate ix. Fig. 3.

DESCRIPTION. The ground colour of the Great Boa is yellowish-gray, on which is distributed along the back, a series of large chain-like, reddish-brown, and sometimes perfectly red variegations, with other smaller and more irregular marks and spots.

This Serpent is a native of Africa, India, the larger Indian islands, and South America, where it chiefly resides in the most retired situations in woods and marshes.

SYNONYMS. Boa Constrictor. *Linn.*—Le Devin. *La Cépède.*—Constrictor Boa. *Shaw.*—*Shaw's Gen Zool. vol. iii tab. 92, 93.*

was stuffed, and sent to the cabinet of the Prince of Orange.

In the Island of Java, we are assured that one of these monsters has been known to kill and devour a buffalo. In a letter, printed in the German Ephemerides, we have an account, by a person who assures us that he witnessed a combat between an enormous serpent and a buffalo. The serpent had, for some time, been waiting near the brink of a pool, in expectation of its prey; when a buffalo was the first animal that appeared. Having darted upon the affrighted beast, it instantly began to wrap him round with its voluminous twistings; and at every twist, the bones of the buffalo were heard to crack as loud as the report of a gun. It was in vain that the animal struggled and bellowed; its enormous enemy entwined it so closely, that at length all its bones were crushed to pieces, like those of a malfactor on the wheel, and the whole body was reduced to one uniform mass: the serpent then untwined its folds, in order to swallow its prey at leisure. To prepare for this, and also to make it slip down the throat the more smoothly, it was seen to lick the whole body over, and thus to cover it with a mucilaginous substance. It then began to swallow it, at the end that afforded the least resistance; and in the act of swallowing, the throat suffered so great a dilatation, that it took in at once substance that was thrice its own thickness.

According to the Bombay Courier, of August 31, 1799, a Malay prow was making for the port of Amboyna; but the pilot, finding she could not enter it before dark, brought her to anchor for the night close under the island of Celebes. One of the crew went on shore into the woods, and on his return, lay down, as it is supposed, to sleep on the beach. In the course of the night he was heard, by his comrades, to scream out for assistance. They immediately went on shore, but it was too late; for an immense snake of this species had crushed him to death. The attention of the mon-

ster being entirely occupied by his prey, the people went boldly up to it, cut off its head, and took both it and the body of the man on board their boat. The snake had seized the man by the right wrist, where the marks of the fangs were very distinct; and the mangled corpse bore evident signs of having been crushed by the monster's twisting itself round the head, neck, breast, and thigh. The length of the snake was about thirty feet, and its thickness equal to that of a moderate-sized man.

A serpent, which measured eighteen feet in length, and eighteen inches in its greatest circumference, was brought from Batavia, in the *Cæsar*, a vessel which, in the year 1817, had been taken up to convey Lord Amherst and his suite to England. Into the cage which contained this animal a living goat was placed. As soon as the goat was within his reach, he raised his head, and, having contemplated his prey a few seconds, felt it with his tongue. The snake, withdrawing his head a short distance, made a sudden dart at the throat of the goat; but was received on the horns of the animal, and obliged for an instant to retreat. He then made a second dart, and seizing the goat by the leg, pulled it violently down, and insinuated his folds, with momentary rapidity, about its body, at the same time squeezing it with all the force he could bring to bear. But the goat was too small to suffer their whole compressing effect, and the snake was obliged to destroy the animal, by throwing the entire weight of his body upon its neck. The goat was eight minutes dying, but was so entirely overwhelmed by the power of the snake, that it could not even struggle.

The snake did not attempt to change its posture for some minutes after the goat was dead. At length he gradually slackened his folds, and then disengaged them one by one, with great caution and slowness, as if to ascertain whether the goat retained any power of motion; and, having entirely disengaged himself, he prepared to swallow the goat, by placing himself op-

posite to its head, and feeling it with his mouth. While doing this, saliva flowed abundantly over his jaws, but he made no attempt to besmear his prey. In a few minutes he took the nose of the goat into his mouth, and endeavoured to draw the head after it; but this appeared to be no easy task. One third of the time consumed in gorging the goat, was occupied in getting down the head and horns. The latter diverged at a considerable angle, and were about four inches in length. Having conquered them, he grappled with the shoulders, which he was some time in mastering; but he readily overcame the remainder of the body. The operation of gorging the whole animal occupied two hours and five minutes.

The appearance of the snake, when in the act of swallowing the shoulders of the goat, was very hideous. He seemed to be suffering strangulation. His checks, immensely dilated, appeared to be bursting, and his windpipe projected three inches beyond his jaws. The horns of the goat, which had advanced only a few inches down his swallow, protruded so much that the spectators expected them to penetrate through the intervening membrane of the scales, which they separated from each other. After the goat was down, the snake scarcely moved from the posture he was in during his last act of deglutition, but fell into a semi-torpid state, from which, for several days, no irritation could rouse him. At this time he measured three feet in his greatest diameter, or double his ordinary bulk. The body of the goat underwent no visible diminution of bulk or consistence by the action of the snake's folds, but seemed to pass down his throat in an entire state.

This snake died on his way to England, forty days after he had swallowed a second goat. His head bore no proportion to the magnitude of the animal which it was capable of swallowing; for its length was not more than five inches, and its greatest breadth was not more than four inches and a half.

We have been assured by travellers, that these

snakes are sometimes found with the body of a stag in their gullet; while the horns, which they are unable to swallow, are seen sticking out at their mouths.

It is happy for mankind that their rapacity is often their own punishment; for, whenever they have gorged themselves in this manner, they become torpid, and may be approached and destroyed with safety. Patient of hunger to a surprising degree, whenever they seize and swallow their prey, they are, like surfeited gluttons, unwieldy, stupid, helpless, and sleepy. They at that time seek for some retreat, where they may lurk for several days together, and digest their meal in safety. The least effort then will destroy them; they scarcely can make any resistance; and equally unqualified for flight or opposition, even the naked Indians do not fear to assail them. But it is otherwise when this sleeping interval of digestion is over; they then issue, with famished appetites, from their retreats, while every animal of the forest flies from their presence.

When Captain Stedman was on board one of his boats on the river Cottica in Surinam, he was informed, by one of his slaves, that a large snake was lying among the brush-wood on the beach, not far distant; and, after some persuasion, he was induced to land, in order to shoot it. At the first shot, the ball missing the head, went through the body: when the animal struck round, and with such astonishing force, as to cut away, with the facility of a scythe mowing grass, all the underwood around; and by flouncing his tail, caused the mud and dirt in which he lay, to fly to a considerable distance, over the heads of the men that were with him. They started back some way, but the snake was quiet again in a few minutes. Captain Stedman again fired, but with no better success than before; and the animal sent up such a cloud of dust and dirt, as he had never seen but in a whirlwind: this caused them once more suddenly to retreat. After some persuasion, he was induced, though much against

his inclination, being exceedingly weak from illness, to make a third attempt. Having, therefore, once more discovered the snake, they discharged their pieces at once, and shot him through the head. The negro brought a boat-rope to drag him to the canoe, which was lying on the bank of the river. This proved no easy undertaking, since the huge creature, notwithstanding his being mortally wounded, still continued to writhe about in such a manner as to render it dangerous for any person to approach him. The negro made a running noose on the rope, and, after some fruitless attempts, threw it over his head with much dexterity; and now, all taking hold of the rope, they dragged him to the beach, and tied him to the stern of the canoe to take him in tow. Being, however, still alive, he there kept swimming like an eel. His length was more than twenty-two feet.

When they came to one of their stations, they hauled him on shore, in order to skin him and take out the oil. To effect this, one of the negroes, having climbed up a tree with the end of a rope, let it down over a strong forked branch, and the others hoisted up the snake, and suspended him from the tree. This done, the former negro, with a sharp knife between his teeth, left the branch, and clung fast upon the monster, which was still writhing, and began his operations by ripping it up, and stripping down the skin as he descended. "Though I perceived (says the captain) that the animal was no longer able to do him any injury, I confess I could not, without emotion, see a man stark naked, black and bloody, clinging with his arms and legs round the slimy and yet living monster." The negroes cut the animal in pieces, and would have eaten it, had they not been refused the use of the kettle to boil it in. The bite of this snake is not venomous; nor is the animal believed to bite at all, from any other impulse than that of anger.

OF THE SNAKES IN GENERAL*.

This tribe comprises a great number of species, (nearly *two hundred*) which differ from each other very greatly, both in size and habit. About one-fifth of the whole have been discovered to be poisonous. These are, in general, distinguishable from the rest, by their large, flattish, and somewhat heart-shaped heads, and by having proportionally shorter bodies. The harmless species have, for the most part, small heads, with more extended bodies.

THE COMMON VIPER, OR ADDER†.

The apparatus of poison in the Viper is very similar to that in the rattle-snake, and all the other poisonous serpents. The symptoms that follow the bite, are an

* All the species of Snakes have scuta, or undivided plates, under the abdomen; and broad alternate squamæ, or scales, beneath the tail.

In the investigation of this tribe, it is to be remarked, that the subcaudal scales, although alternate, are reckoned by pairs; so that the number marked by Linnæus for the respective species, always means the number of pairs.

† See Plate xiv. Fig. 6.

DESCRIPTION. These serpents do not often exceed the length of two feet, though they are sometimes found above three. The ground colour of their bodies is a dirty yellow, deeper in the female than in the male. The back is marked throughout with a series of rhomboidal black spots, joined to each other at the points; and the sides have triangular ones. The belly is entirely black. The Viper is chiefly distinguished from the common snake by its darker belly; the head being much thicker than the body; and in particular by the tail, which, though it ends in a point, does not taper to so great a length as in the snake. When, therefore, other distinctions fail, the difference of the tail may be distinguished at a single glance.

SYNONYMS. Coluber berus. Linn.—Vipère. La Cépède.—English Viper. Ray.—Shaw's Gen. Zool. vol. iii. tab. 101.—Penn. Brit. Zool. iii. tab. 4.

acute pain in the wounded part, with a swelling, at first red, but afterwards livid, which, by degrees, spreads to the adjoining parts; with great faintness, and a quick, though low, and sometimes interrupted pulse; sickness at the stomach, with bilious, convulsive vomitings, cold sweats, and sometimes pain about the navel. The most esteemed remedy is common salad-oil, thoroughly rubbed on the wounded part. This is always used by the viper-catchers. The bite of the Viper in this country, although it produces a painful and troublesome swelling, is rarely attended with any other bad consequence.

The poison, according to Dr. Mead, when diluted with a little warm water, and applied to the tip of the tongue, is sharp and fiery, a sensation taking place, as though the tongue was struck through with something scalding or burning. This, he says, goes off in two or three hours. One person, mentioned by Dr. Mead, tried a large drop of it undiluted; in consequence of which his tongue swelled with a little inflammation; and the soreness lasted two days. Other persons, on the contrary, assert it to have no particular acrimony of taste, but that, in this respect, it somewhat resembles oil or gum. Contradictions nearly equal have taken place relative to the effect of viperine poison taken into the stomach. Boerhaave affirms that it produces no ill effects whatever; and the Abbé Fontana, that it cannot be swallowed with impunity; although he is one of those who assert its being devoid of any thing unpleasant to the taste. We are told, however, that in the presence of the Grand Duke of Tuscany, while the philosophers were making elaborate dissertations on the danger of the poison taken inwardly, a viper-catcher, who happened to be present, requested that a quantity of it might be put into a vessel, and then, with the utmost confidence, and to the astonishment of the whole company, drank it off in their presence. Every one expected the man instantly to drop down dead; but, says the relator of the story, they soon perceived their mis-

take, and found that, taken inwardly, the poison was as harmless as water.

The Viper is the only one, either of the Reptile or Serpent tribes, in Great Britain, from whose bite we have any thing to fear. All the others are either entirely destitute of poison, or, if they possess any, it is not injurious to man.

These animals are viviparous, and produce their offspring towards the close of summer. The eggs, which are hatched in the womb, are usually ten or twelve only in number, and chained together somewhat like a string of beads. When the young-ones have burst the shell, they creep from their confinement into the open air, where they continue for several days without taking any food. The Rev. Mr. White, of Selborne, in company with a friend, surprised a large female Viper, which, as she lay on the grass, basking in the sun, seemed very heavy and bloated. They killed and opened her, and found in the abdomen fifteen young-ones, about the size of full-grown earth-worms. This little fry issued into the world with the true Viper spirit about them, showing great alertness as soon as they were disengaged from the body of the parent. They twisted and wriggled about, set themselves up, and gaped very wide when touched with a stick; exhibiting manifest tokens of menace and defiance, though as yet no fangs were to be discovered, even by the help of glasses.

That young Vipers, for some time after their birth, retreat, when suddenly alarmed, into the mouth of the female, in the same manner as the young of the opossum do into the abdominal pouch of their parent, seems a fact satisfactorily ascertained. Vipers attain their full growth in about seven years. Their food consists of reptiles, worms, or young birds, which they swallow whole, though it sometimes happens that the morsel is thrice the thickness of their own body.

They are capable of supporting long abstinence: a Viper was kept more than six months in a box without

food; during which time its vivacity was not lessened. When at liberty these animals remain torpid throughout the winter: yet, when confined, they have never been observed to take their annual repose.

Vipers are very generally dispersed over the old Continent, and are by no means uncommon in our own island, particularly in the dry, stony, and chalky countries. They are usually caught with wooden tongs, by the end of the tail. This is done without danger; for while they are held in that position, they cannot injure their enemy.

The flesh of Vipers was formerly in high esteem as a remedy for various diseases, but particularly as a restorative. It has, however, of late years, lost much of its ancient credit, and is very rarely prescribed by modern practitioners.

THE COMMON OR RINGED SNAKE*.

The Common or Ringed Snakes are well-known inhabitants of moist and warm woods in this country, on the dry banks of which they are often seen during the summer, either sleeping or basking themselves. They are harmless and inoffensive animals, being totally destitute of every means of injuring mankind.

The female deposits her eggs in holes fronting the south, near stagnant waters; but more frequently in dunghills, in the form of a chain of ova, from twelve to twenty in number. These are about the size of the eggs of the blackbird, of a whitish colour, and covered with a parchment-like membrane. The young animals are rolled up spirally within the middle of the fluid, which nearly resembles the white of a fowl's egg. They are not hatched until the spring following the time when they are laid.

In winter these snakes conceal themselves, and be-

* SYNONYMS. *Coluber natrix*. *Linnaeus*.—Ringed Snake. *Penn.*—*Penn. Brit. Zool. vol. iii. tab. 4.*

come nearly torpid; re-appearing in spring, when they uniformly cast their skins. This is a process which they also seem to undergo in the autumn. Mr. White says, "About the middle of this month, (September) we found in a field, near a hedge, the slough of a large snake, which seemed to have been newly cast. It appeared as if turned wrong-side outward, and as if it had been drawn off backward, like a stocking or a woman's glove. Not only the whole skin, but even the scales from the eyes were peeled off, and appeared in the head of the slough like a pair of spectacles. The reptile at the time of changing his coat had entangled himself intricately in the grass and weeds, in order that the friction of the stalks and blades might promote this curious shifting of his exuvia.

It would be a most entertaining sight, could a person be an eye-witness to such a feat, and see the snake in the act of changing its garment. As the convexity of the eyes in the slough is not inward, that circumstance alone is a proof that the skin has been turned; not to mention that now the inside is much darker than the outer. Thus it appears that snakes crawl out of the mouth of their own sloughs, and quit the tail-part last, just as eels are skinned by a cook-maid. While the scales of the eyes are becoming loose, and a new skin is forming, the creature, in appearance, must be blind, and must feel itself in a very awkward and uneasy situation.

The earliest time of the snakes making their appearance is in the month of March, from which time, till the middle of May, they are found in vast numbers on warm banks, in moist and shady places, among thickets and brushwood.

Several instances have occurred of the common Snake being in some degree domesticated. Mr. White says that he knew a gentleman who had one in his house quite tame. Though this snake was usually as sweet in its person as any other animal, yet, whenever a stranger, or a dog or cat entered, it would begin to

hiss, and would soon fill the room with a stench so nauseous as to be almost insupportable.

The Rev. Revett Sheppard, F. L. S. when an undergraduate of Caius College, Cambridge, had a Common Snake in his rooms nearly three months. He kept it in a box of bran; and, during all that time, he never could discover that it ate any thing, although he frequently put both eggs and frogs, the favourite food of this species, into the box. When he was in the room he used to let the animal out of its prison. It would first crawl several times round the floor, apparently with a desire to escape; and when it found its attempts fruitless, would climb up the tables and chairs, and not unfrequently even up the chair of its owner, as he sat at table. At length it became so familiar as to lie in a serpentine form on the upper bar of his chair: it would crawl through his fingers, if held at a little distance before its head, or lie at full length upon his table, while he was writing or reading, and this for an hour or more at a time. When first brought into the room, it used to hiss and dart out its forked tongue; but in no instance did it emit any unpleasant vapour. In all its actions it was remarkably cleanly. Sometimes it was indulged with a run upon the grass, in the court of the college; and sometimes with a swim in a large basin of water, which it seemed to enjoy very much. When this gentleman left the University, he gave his bed-maker orders to turn it out into the fields; which, he believes, was done.

These animals prey on frogs, insects, worms, and mice; for the former of which they often go into the water, where they swim with great elegance. After a snake has devoured a tolerably large frog, or a small bird, its prey will be seen to form a knot in its body; and it then becomes so stupid and inactive as easily to be caught. Mr. Sheppard was witness to one of these animals seizing a frog. It laid hold of the frog by one of the legs, and immediately began to swallow it. He watched them for nearly a quarter of an hour; when

the poor frog cried out so piteously that he determined to release it; but in the struggle the leg and thigh had been torn off and devoured. The Common Snakes are said to be particularly fond of milk; so much so, that they will occasionally creep into dairies to drink the milk from the vessels. It is even said that they will twine themselves round the legs of cows, in order to reach their udders.

THE HOODED OR SPECTACLE SNAKE*.

When it is irritated or preparing to bite, this animal crects its body, bends down its head, and seems, as it were, hooded by the expanded skin of the neck: hence its name of *Cobra di Capello*, or Hooded Serpent. It opens its mouth, exhibiting its "sharp poisonous fangs; and then springs on its enemy with great agility.

From its frequently moving along with great part of its body erect, and with its head in continual action, as if looking around with great circumspection, this species in India is esteemed the emblem of prudence. It is also an object of superstitious veneration among the Gentoo Indians, founded on some traits of legendary mythology: they seldom name it without adding some epithet, such as the royal, the good, the holy. Some

* **DESCRIPTION.** This dreadful Serpent is very common in many parts of India. Its general length is three or four feet, and its thickness somewhat more than an inch. The head is rather small; and a little beyond it there is a lateral dilatation of the skin, which is continued till the length of about four inches downward, when it gradually sinks into the cylindrical form of the rest of the body. This part is capable of being extended by the animal at pleasure. It is usually marked on the top by a very large and conspicuous patch, resembling a pair of spectacles. The usual colour of the Hooded Snake is a pale rusty brown above, and beneath a bluish white, tinged with yellow. The tail tapers to a slender and sharply-pointed extremity.

SYNONYMS. Couber Naja. *Linnaeus*.—Cobra di Capello. *Var.*—*Shaw's Gen. Zool.* vol. iii. tab. 107.

of the Gentoos are happy when they see it crawling about their houses; though they are liable to great injury from its bite. This is sometimes mortal in two or three hours, especially if the poison has penetrated the larger vessels or muscles. A dog bitten by a Hooded Snake died in twenty-seven minutes; and another survived fifty-six minutes. A chicken died in less than half a minute, though others survived a couple of hours; depending, probably, on the heat of the weather, and the condition of the serpent at the time.

In India the Hooded Snake is carried about in a basket, to be publicly exhibited as a show, being first deprived of its fangs, in order to secure the men from the danger of its bite. At the sound of a flageolet it is taught to assume a kind of dancing attitude and motions, which it continues as long as its master continues his music.

THE BLACK SNAKE*.

The activity of these animals is astonishing, for, in speed, they will sometimes equal a horse. Their different motions are very diverting: they will at times climb the trees in quest of tree-frogs; or, for other prey, they will glide at full length along the ground. On some occasions, they present themselves half erect, and in this posture their eyes and their heads appear to great advantage. The former display a fiery brightness, by means of which we are told they are able to fascinate birds, and the smaller quadrupeds, in a manner similar to the rattle-snake. Their body is said to be so brittle, that if, when pursued, they get their head

* DESCRIPTION. The Black Snake is a North American Serpent, that grows to a great length. It is very smooth and slender, black on the upper parts, and of a pale blue beneath, except the throat, which is white.

SYNONYMS. *Coluber Constrictor*. Linn.—Knot. Kerr's *La Cepede*.—Le Lien. *La Cepede*.

into a hole, and a person seize hold of the tail, this will often twist itself to pieces.

The Black Snake is sometimes bold enough to attack mankind, but it may be driven off by a smart stroke from a stick, or whatever other weapon he may chance to have in his hand. When the snake overtakes a person who has endeavoured to escape, (not having had courage enough to oppose it,) it is said to wind itself round his legs in such a manner as to throw him down, and then to bite him in the leg, or wherever else it can lay hold of, and run off again.

During Professor Kalm's residence at New York, Doctor Colden told him that, in the spring of 1748, he had several workmen at his country-seat, and among them one just arrived from Europe, who, of course, knew but little of the qualities of the Black Snake. The other workmen, having observed a male and female lying together, engaged their new companion to kill one of them. He accordingly approached them with a stick in his hand: this the male observed, and made towards him. The man little expected to find so much courage in such a reptile, and flinging away his stick, ran off as fast as he was able. The Snake pursued, overtook him, and twisting several times round his legs, threw him down, and almost frightened the poor fellow out of his senses. He could not rid himself of the animal, without cutting it through the body in two or three places with a knife. The other workmen laughed heartily at the incident, without once offering to assist their companion, considering the whole affair only as a scene of the highest amusement.

This Snake, which is altogether innoxious, is very greedy of milk, and it is difficult to keep it out when once it is accustomed to get into a cellar where milk is kept. It has been seen eating milk out of the same dish with children, without biting them, though, they have given it blows with their spoons upon the head, when it was too greedy.

The Black Snake is said to be found extremely use-

ful in America, in clearing houses of rats. These it pursues with wonderful agility, even to the very roofs of barns and out-houses. It is also said to destroy the rattle-snakes, by twisting round their bodies, and suffocating them by the violence of its contractile force. It is so swift that there is no escaping its pursuit, but its bite has no more effect than a scratch with a pin. All the mischief this species does, is to the farmers' wives, in skimming the milk-pans of the cream, and robbing the hen-roosts of their eggs. It is not uncommon to find it coiled up in a nest under a sitting hen.

The following description of a contest between the Black Snake, and another species, is extracted from Mr. St. John's Letters of an American Farmer: "One of my constant walks when I am at leisure (says this gentleman) is in my lowlands, where I have the pleasure of seeing my cattle, horses, and colts. Exuberant grass replenishes all my fields, the best representative of our wealth. In the middle of that tract, I have cut a ditch, eight feet wide. On each side of this I carefully sow every year some grains of hemp, the plants from which rise to the height of fifteen feet, so strong and full of limbs as to resemble young trees. These produce natural arbours, rendered often still more compact by the assistance of an annual creeping plant, which we call a vine, that never fails to entwine itself among the branches, and always produces a very desirable shade. As I was one day sitting, solitary and pensive, in this primitive arbour, my attention was engaged by a strange sort of rustling noise, at some paces' distance. I looked all around without distinguishing any thing, until I climbed up one of my great hemp-stalks; when, to my astonishment, I beheld two snakes of considerable length, the one pursuing the other with great celerity, through a hemp stubble field. The aggressor was of the black kind, six feet long; the fugitive was a Water Snake, nearly of equal dimensions. They soon met, and, in the fury of their first encounter, appeared in an instant firmly twisted together; and.

whilst their united tails beat the ground, they mutually tried with open jaws to lacerate each other. What a fell aspect did they present! Their heads were compressed to a very small size; their eyes flashed fire; and after this conflict had lasted about five minutes, the second found means to disengage itself from the first, and hurried towards the ditch. Its antagonist instantly assumed a new posture, and half creeping, half erect, with a majestic mien, overtook and attacked the other again, which placed itself in a similar attitude, and prepared to resist. The scene was uncommon and beautiful, for thus opposed, they fought with their jaws, biting each other with the utmost rage; but notwithstanding this appearance of mutual courage and fury, the water-snake still seemed desirous of retreating towards the ditch, its natural element. This was no sooner perceived by the keen-eyed black one, than, twisting its tail twice round a stalk of hemp, and seizing its adversary by the throat, not by means of its jaws, but by twisting its own neck twice round that of the water-snake, he pulled it back from the ditch. To prevent a defeat, the latter took hold likewise of a stalk on the bank, and, by the acquisition of that point of resistance, became a match for his fierce antagonist. Strange was this to behold: two great snakes strongly adhering to the ground, mutually fastened together by means of the writhings which lashed them to each other, and stretched at their full length, they pulled, but pulled in vain; and, in the moments of greatest exertion, that part of their bodies which was entwined, seemed extremely small, while the rest appeared inflated, and now and then convulsed with strong undulations, rapidly following each other. Their eyes appeared on fire, and ready to start out of their heads. At one time the conflict seemed decided; the water-snake bent itself into great folds, and by that operation rendered the other more than commonly outstretched; the next minute the new struggles of the black one gained an unexpected superiority, it acquired

two great folds likewise, which necessarily extended the body of its adversary, in proportion as it had contracted its own. These efforts were alternate: victory seemed doubtful, inclining sometimes to one side, sometimes to the other; until at last the stalk to which the black snake was fastened, suddenly gave way, and, in consequence of this accident, they both plunged into the ditch. The water did not extinguish their vindictive rage, for by their agitations I could still trace, though I could not distinguish, their attacks. They soon re-appeared on the surface, twisted together, as in their first onset: but the black snake seemed to retain its wonted superiority; for its head was exactly fixed above that of the other, which it incessantly pressed down under the water, until its opponent was stifled, and sunk. The victor no sooner perceived its enemy incapable of further resistance, than, abandoning it to the current, it returned to the shore and disappeared."

FISHES*.

Apodal Fish†.

OF THE EEL TRIBE IN GENERAL‡.

THE Apodal Fish, of which the Eel forms the first Linnean tribe, in their appearance and manners, approach, in some instances, very nearly to the serpents. They have a smooth and slippery skin, and are in general naked, or covered only with small, soft, and distant scales. Their bodies are long and slender, and they are supposed to live entirely on animal substances.

There are about nine species, most of which are found only in the seas. One of these frequents our fresh waters, and three others occasionally visit our shores.

THE COMMON EEL§.

The Common Eel evidently forms a connecting link, in the chain of nature, between the serpents and the fishes. It possesses not only the serpent form, but also many of the habits of serpents.

* For an account of Fishes in general, see vol. i. p. 33.

† The Fishes of the Linnean order *Apodes*, have bony gills, and no ventral fins.

‡ The Eels have a smooth head, and tubular nostrils. Their gill-membrane has ten rays. The body is nearly cylindrical, smooth, and slippery. The tail, and the back and anal fins, are united. The spiracle is behind the head or the pectoral fins.

§ SYNONYMS. *Muraena Anguilla*. Linn.—L'Anguille, in France.

The Eel is frequently known to quit its own element, and to wander, in the evening or night, over meadows, in search of snails and other prey, or to other ponds for change of habitation. This will account for Eels being found in waters that have not been suspected to contain them. An instance of this rambling spirit of the Eel is mentioned in Plott's *Natural History of Staffordshire*; and, from the following lines of Oppian, it appears to have been known to the ancients :

Thus the mail'd Tortoise, and the wand'ring Eel,
Oft to the neighbouring beach will silent steal.

Mr. Arderon, in the *Philosophical Transactions*, says, that in June, 1746, while he was viewing the flood-gates belonging to the water-works of Norwich, he observed a great number of Eels sliding up them, and up the adjacent posts, to the height of five or six feet above the surface of the water. They ascended with the utmost facility, though many of the posts were perfectly dry, and quite smooth. They first thrust their heads and about half their bodies out of the water, and held them against the wood-work for some time; Mr. Arderon imagines, till they found the viscosity of their bodies sufficiently thick, by exposure to the air, to support their weight. They then began to ascend directly upward, and with as much apparent ease as if they had been sliding on level ground; this they continued to do till they reached the dam above.

Of the migration of young Eels from one part of a river to another, an instance is related by Dr. Anderson, in his publication called the *Bee*. "Having occasion (says this gentleman) to be once on a visit at a friend's house on Dee-side, in Aberdeenshire, I often delighted to walk by the banks of the river. I one day observed something like a black string, moving along the edge of the river in shoal water. On closer inspection I discovered that this was a shoal of young

Eels, so closely joined together as to appear, at a superficial view, one continued body, moving briskly up against the stream. To avoid the retardation which they experienced from the force of the current, they kept close along the water's edge the whole of the way, following all the bendings and sinuosities of the river. Where they were embayed, and in still water, the shoal dilated in breadth, so as sometimes to be nearly a foot broad; but when they turned a cape, where the current was strong, they were forced to occupy less space, and to press close to the shore, struggling very hard till they passed it.

“ This shoal continued to move on, night and day, without interruption, for several weeks. Their progress might be at the rate of about a mile an hour. It was easy to catch the animals, though they were very active and nimble. They were Eels, in every respect perfectly formed, but not exceeding two inches in length. I conceive that the shoal did not contain, on an average, less than from twelve to twenty in breadth; so that the number which passed on the whole, during their progress, must have been very great. Whence they came, or whither they went, I know not. The place where I remarked them at, was six miles from the sea, and I am told that the same phenomenon takes place every year, about the same season.”

The usual haunts of Eels are in mud, among weeds, under the roots or stumps of trees, or in holes in the banks or the bottom of rivers. They are partial to still waters, and particularly to such as are muddy at the bottom. Here they often grow to an enormous size, sometimes weighing fifteen or sixteen pounds. One that was caught near Peterborough, in the year 1667, measured a yard and three quarters in length.

When kept in ponds, these fish have been known to destroy young ducks. Sir John Hawkins, from a canal near his house at Twickenham, missed many of the

young ducks ; and, on draining, in order to clean it, he discovered in the mud great numbers of large Eels. In the stomachs of many of these were found, undigested, the heads and part of the bodies of the ducks. Eels seldom come out of their hiding-places except in the night, during which time they are caught with lines that have several baited hooks. In winter they bury themselves deep in the mud, and, like the serpent tribe, remain in a state of torpor. They are so impatient of cold, as eagerly to take shelter even in a wisp of straw, if flung into a pond in severe weather ; and this has sometimes been practised as a mode of catching them.

Eels are viviparous, or produce living offspring. They are so tenacious of life, that their parts will continue to move for a considerable time after they are skinned and cut into pieces ; and no other fish whatever will live so long out of the water as these. They are best in season from May to July ; but they may be caught with a line till September. When the water is thick with rains, they may be fished for during the whole day ; but the largest and best are caught by night-lines. The usual baits are dew-worms, minnows, or gudgeons.

THE CONGER EEL*.

When at its full size, the Conger Eel has sometimes been known to measure more than ten feet in length,

* **DESCRIPTION.** The Conger differs from the Common Eel, principally, in having the lower jaw shorter than the upper ; and in the lateral line being whitish, with a row of spots. The colour of the body also is darker ; and the edges of the dorsal and anal fins are black. The eyes also are, in proportion, larger ; and the irides of a bright silvery colour.

SYNONYMS. *Muraena conger.* Linn.—*La Murène congre.* La Cèpede.—*Le Congre.* Bloch.—*Heawe Eel*, in Scotland.—*Elvers*, the young-ones.

and from fourteen to sixteen inches in circumference. It is one of the most dangerous and most powerful enemies with which the fishermen of the British Islands have to contend. Being usually caught by a hook and line, it requires some care to land and kill the large ones without injury. We are informed, that on such occasions they have been known to entwine themselves round the legs of a fisherman, and to fight with the utmost fury. A Conger, six feet in length, was caught in the Wash at Yarmouth, in April, 1808; but not until after a severe contest with the man who had seized it. The animal is stated to have risen half erect, and to have actually knocked the fisherman down before he could secure it. This Conger weighed only about sixty pounds; but some of the largest exceed even a hundred weight.

The voracity of these fish is enormously great. They often lie concealed, in the mud or sand, at the mouths of large rivers, for the purpose of seizing upon any prey which passes either in or out. If this happen to be so large as not otherwise to be immediately overcome, we are told that the Conger will coil its body round, and thus prevent its escape; whilst, in the mean time, it kills it by means of its teeth. It devours great quantities of the different species of cuttle-fish, and other soft marine animals, which have not sufficient agility or address to escape from its pursuit.

Until the Congers are grown to a size so large that they are able stoutly to defend themselves, they are liable to attack from numerous foes. The wolf-fish*, all the larger species of rays, and even the sea crawfish, and lobsters, destroy them in vast numbers.

During the winter months, it is said that these fish conceal themselves deep in the mud; and that, so long as the cold weather lasts, they seldom come forth from

* *Anarichas lupus*, of Linnæus.

their retreats. They are occasionally found on almost all the shores of Great Britain and Ireland; and in some places in vast abundance. From Mount's Bay in Cornwall, there have, in some years, been upwards of ten ton weight of dried Congers exported to different parts of Spain and Portugal.

They are here principally caught with strong lines, each about five hundred feet in length, and having sixty hooks, about eight feet asunder. These lines, (which are called *butlers*) are sunk at one end by means of a stone, or other weight, sufficiently heavy to prevent the action of the waves from moving them. In some instances the fishermen fasten several of the lines together, making the whole sometimes to extend nearly a mile in length.

The flesh of the Conger is white, and is considered by some persons as good eating: to others, on the contrary, it is extremely disgusting, for it is both coarse and greasy.

OF THE GYMNOTUS TRIBE IN GENERAL*.

Some of the species of *Gymnotus* inhabit the fresh waters, and others live in the ocean. They are all, except three, confined to the New Continent.

THE ELECTRICAL GYMNOTUS OR EEL†.

These fishes possess the singular property of giving a shock, (similar in its effects to that produced from a

* Their head is furnished with lateral opercula; and there are two tentacula on the upper lip. The gill-membrane has five rays. The body is compressed, and has a fin running along the under parts.

† See Plate xvi. Fig. 1.

DESCRIPTION. On a transient view, this fish has a great resemblance, both in shape and colour, to the common eel. It is from three to four feet in length; and, in the thickest part of

charged jar,) to any body, or any number of bodies connected together. In different publications, domestic and foreign, we have numerous accounts of experiments on the Electric Eel; the best of these are inserted in the Philosophical Transactions, by Dr. Williamson and Dr. Garden.

The former of these gentlemen says, that on touching an Electrical Eel with one hand, a sensation is experienced similar to that arising from touching the conductor of an electrical machine: with a short iron rod the same was felt, but less powerfully. While another person provoked the fish, Dr. Williamson put his hand into the water, at the distance of three feet from it, and felt an unpleasant sensation in the joints of his fingers. Some small fish were thrown into the water, and the animal immediately stunned and swallowed them. A larger fish was thrown in, which he stunned likewise and attempted to swallow; but, from its size, he could not do so. Dr. Williamson put his hand into the water, and had another fish thrown in at some distance. The Eel swam up to it, and at first turned away without offering it any violence: after a little time he returned, and, looking steadfastly at it for a few seconds, gave it a

its body, ten or twelve inches in circumference. The head is flat, and the mouth wide, and destitute of teeth. A fin about two inches deep extends from the point of its tail to within six inches of the head; and, where it joins the body, this fin is almost an inch thick. Across the body there are several annular divisions, or rather rugæ of the skin, from which the fish should seem to partake of a vermicuiar nature, and to have the power of contracting or dilating itself at pleasure. It is able to swim backward as well as forward.

This most singular fish is peculiar to South America, where it is found only in the rocky parts of rivers, at a great distance from the sea.

SYNONYMS. *Gymnotus electricus.* *Linnaus.*—Cold Eel. *Smith.*—Cramp-fish. Numbing Eel, by the English.—Beave Aal, by the Dutch.—Electric Eel. *Phil. Trans.*—*Anguille tremblante*, by the French.

shock, by which it instantly turned upon its back, and became motionless. Dr. Williamson at that very instant felt the same sensation in his fingers, as he had done when he put his hand into the water before. A fish was afterwards struck, but not quite killed. When the Electric Eel perceived this, he returned, and at a second shock, evidently more severe than the former, rendered it motionless. On touching the Eel with one hand so as to provoke it, and holding the other in the water at a little distance, a severe shock was felt through both the arms and across the breast, similar to that from a charged jar. Eight or ten persons, with their hands joined, experienced the same, on the first touching the head, and the last the tail of the fish. A dog being made a link in this chain, uttered a loud yell at the instant of contact. When the Eel was touched with silk, glass, or any other non-conductor, no shock was felt. From a long series of experiments, it appeared to Dr. Williamson that these properties partook so nearly of the nature of electricity, that whatever would convey the electrical fluid, would also convey the fluid discharged by the Eel; and *vice versâ*. He, however, was not able to observe that any spark was produced on contact. This mode of defence the fish never adopted except it was irritated; and Dr. Williamson has passed his hand along the back and sides from head to tail, and has even lifted part of its body out of the water, without exciting it to injure him.

Mr. Bryant mentions an instance of the shock from one of these fish being felt through a considerable thickness of wood. One morning, while he was standing by, as a servant was emptying a tub, in which an Electrical Eel was contained, he had lifted it entirely from the ground, and was pouring off the water to renew it, when he received a shock so violent as occasioned him to let the tub fall. Mr. B. then called another person to his assistance, and caused them together to lift up the tub, each laying hold only on the outside. When they

were pouring off the remainder of the water, they each received a shock so smart, that they were compelled to desist.

Persons have been knocked down with the stroke. One of these fish having been shaken from a net upon grass, an English sailor, notwithstanding all the persuasions that were used to prevent him, would insist on taking it up; but the moment he grasped it, he dropped down in a fit; his eyes were fixed; his face became livid; and it was not without difficulty that his senses were restored. He said, that the instant he touched it, "the cold ran swiftly up his arm into his body, and pierced him to the heart."

A negro, who attempted with his hands to grasp a large fish, had, in consequence, a confirmed paralysis in both his arms.

Dr. Garden says, that for a person to receive a shock from the Electrical Eel, it is necessary to take hold of the fish with both hands, at some considerable distance from each other, so as to form a communication betwixt them. He held a large one several times by one hand without having received a shock, but he never touched any of them with both his hands without feeling a smart shock. The remainder of his experiments, though not so numerous, tend to confirm the truth of those that were made by Dr. Williamson.

The account of Captain Stedman differs from the above in one essential particular: he says, that it is by no means necessary to grasp the animal with both hands in order to receive the shock, and that he has himself experienced the contrary effect. For a small wager he attempted several times to seize an Electrical Eel with one hand, and at every trial he had a severe shock, which extended to the top of his shoulder; and after about twenty different attempts, to no purpose, he was compelled to desist.

This property seems principally of use to the Electrical Eels in securing their food; for being destitute of teeth, they would otherwise be scarcely able to seize it.

The force of the shock has been satisfactorily proved to depend entirely on the will, and to be exerted as circumstances require. The prey of these fish are generally so stunned by the shock, as to appear dead; but when these have been taken into another vessel, they have been always found to recover. When the Electrical Eels are hungry, they are tolerably keen in pursuit of their food; but they are soon satisfied, not being able to devour much at one time. An Electrical Eel, upwards of three feet in length, could not swallow a fish more than three, or at most three inches and a half long.

The organs which produce this wonderful accumulation of electric matter, constitute nearly one half of that part of the flesh in which they are placed, and, perhaps, compose more than one third of the whole animal. There are two pairs of these organs, one on each side. Their structure is very simple and regular, consisting only of flat partitions, with cross divisions between them. The partitions are thin membranes placed nearly parallel to one another, and of different lengths and breadths. Their distances from each other differ with the size of the fish: in one of two feet four inches in length, they were found to be the $\frac{1}{512}$ nd part of an inch asunder. They appear to answer the same purpose as the columns of the torpedo, making walls or buttments for the subdivisions, and are to be considered as forming so many distinct organs: they are so tender as to be easily lacerated. These fish are furnished with many pairs of nerves appropriated to their management; but how such surprising effects can be produced by organs of this description, in a fluid also extremely ill-adapted to the purpose, has not yet been satisfactorily explained.

These Eels, when very young, are sometimes caught in Guiana, and preserved for amusement in large troughs filled with water. They are usually fed with small fish, earth-worms, or cock-roaches, the latter of which are the most agreeable of all food to them.

OF THE SWORD-FISHES IN GENERAL*.

These are very large and powerful animals, often growing to the length of twenty feet and upwards. Their voracity is unbounded, for they attack and destroy almost every living thing that comes in their way. The larger fish they penetrate with their long, hard, and sword-shaped upper jaw. There are two species, one only of which is found in the European seas.

THE BROAD-FINNED† AND THE EUROPEAN SWORD-FISH‡.

The former of these inhabit the Brazilian and East-Indian Seas, and also the Northern Ocean. They fre-

* The head of the Sword-fish is furnished with a hard, and elongated upper jaw. The mouth has no teeth. The gill-membrane is eight-rayed; and the body is rounded, and has no apparent scales.

† DESCRIPTION. The body of the Broad-finned Sword-fish, is of a silvery bluish white colour, except the upper parts of the back, and the head and tail, which are of a deep brown. The skin is smooth, and without any appearance of scales. From the long sharp-pointed process in front of the head, it would seem, on a cursory view, to be allied to the European species; but it differs from this, in having an extremely broad back-fin, and two long sharp-pointed appendages proceeding from the thorax.

SYNONYMS. *Xiphias platypterus* Shaw.—Indian Sword-fish. *Var.*—Broad-finned Sword-fish. *Shaw's Nat. Mis.*

‡ See Plate xvii. Fig. 1.

DESCRIPTION. This species differs from the former principally in having its dorsal-fin falcate or scythe-shaped, and in being destitute of the two long and sharp appendages on the thorax.

SYNONYMS. *Xiphias gladius*. *Linnaeus*.—Le *Xiphias* Espadon. *La Cepede*.—L'Empereur. *Bloch*.—L'Espadon, ou L'Epee de mer, in France.—Sicilian Sword-fish. *Penn.*—*Penn. Brit. Zool. tab. 26.*

quently grow to the length of twenty feet or upwards, and are very powerful fish.

When his majesty's ship *Leopard*, after her return from the coast of Guinea and the West Indies, was ordered, in 1725, to be cleaned and refitted for the Channel service, in stripping off her sheathing the shipwrights found in her bottom, pointing in a direction from the stern towards the head, part of the sword or snout of one of these fishes. On the outside, this was rough, not unlike seal-skin, and the end, where it was broken off, appeared like a coarse kind of ivory. The fish, from the direction in which the sword lay, is supposed to have followed the ship when under sail. The weapon had penetrated through the sheathing, which was an inch thick; had passed through three inches of plank, and beyond that, four inches and a half into the timber. The force requisite to effect this must have been excessively great, especially as no shock was felt by the persons on board. The workmen declared that it would be impossible, with a hammer of a quarter of a hundred weight, to drive an iron pin of the same form and size into that wood, and to the same depth, by less than eight or nine strokes, whilst this had been effected by only one.

And about sixteen years ago, a letter was written to Sir Joseph Banks, as president of the Royal Society, from the captain of an East Indiaman, and was accompanied by an account of another instance of the amazing strength which this fish occasionally exerts. The bottom of this ship had been pierced through in such a manner, that the sword was completely imbedded, or driven through its whole length, and the fish killed by the violence of the effort. A part of the bottom of the vessel, with the sword imbedded in it, is now deposited in the British Museum.

The Sword-fishes and the whale are said never to meet without coming to battle; and the former has the reputation of being always the aggressor. Sometimes two Sword-fishes join against one whale; in which case

the combat is by no means equal. The whale uses his tail only in his defence: he dives down into the water, head foremost, and makes such a blow with his tail, that, if it take effect, finishes the Sword-fish at a stroke: but the other, which in general is sufficiently adroit to avoid it, immediately falls upon the whale, and buries his weapon in his sides. When the whale discovers the Sword-fish darting upon him, he dives to the bottom, but is closely pursued by his antagonist, who compels him again to rise to the surface. The battle then begins afresh, and lasts until the Sword-fish loses sight of the whale, who is at length compelled to swim off, which his superior agility enables him to do. In the Sword-fish piercing the whale's body with the tremendous weapon at his snout, he seldom does any great damage to the animal, from not being able to penetrate much beyond the blubber.

The *European Sword-fish* has sometimes been found on the British coasts; and is very common in the Mediterranean,

Jugular Fish*.

OF THE COD TRIBE IN GENERAL†.

This is a numerous tribe, the animals of which inhabit only the depths of the ocean, and seldom visit the fresh waters. They are in general gregarious, and feed on the smaller fish and other marine animals.

* The fishes of the Linnæan order *Jugulares*, have bony gills, and ventral fins before the pectoral ones.

† The head in the different species of Cod-fish is smooth;

The flesh of most of them is white, firm, and good eating.

THE COMMON COD

These fish are only found in the seas of the northern parts of the world; and the great rendezvous for them are the sand-banks of Newfoundland, Nova Scotia, and New England. These shallows are their favourite situations; for here they are able to obtain great quantities of worms, a food that is peculiarly grateful to them. Another cause of their attachment to these places, is their vicinity to the polar seas, where they return to spawn. There they deposit their roes in full security, and afterwards repair, as soon as the first more southern seas are open, to the banks for subsistence. Few are taken north of Iceland, and the shoals never reach so far south as the Straits of Gibraltar.

Prior to the discovery of Newfoundland, the principal fisheries for Cod were in the seas off Iceland, and off the Western Islands of Scotland. To the former of these, the English navigators resorted nearly four hundred years ago. In the reign of James the First, we had no fewer than 150 vessels employed in the Iceland fishery.

The chief fisheries now, are in the Bay of Canada, on the great bank of Newfoundland, and off the isle of St. Peter, and the isle of Sable. The vessels frequenting these fisheries, are from a hundred to two hundred tons burden, and will catch 30,000 Cod or upwards

and the gill-membrane has seven rays. The body is oblong, and covered with deciduous scales. The fins are all covered with the common skin. The rays of the fins are unarmed; and the ventral fins are slender, and terminate in a point.

* **SYNONYMS.** *Gadus morhua*. Linn.—Keeling. *Ray*.—*La Morue*, in France.

each. The hook and the line are the only implements employed in taking the fish; and this in a depth of water from sixteen to sixty fathoms. The great bank of Newfoundland, is represented to be like a vast mountain, above five hundred miles long, and nearly three hundred broad; and the number of British seamen employed upon it, is supposed to be about fifteen thousand.

The best season for fishing, is from the beginning of February, to the end of April; and though each man takes no more than one fish at a time, an expert fisherman will sometimes catch four hundred in a day. The employment is excessively fatiguing, from the weight of the fish, and the great coldness of the climate.

As soon as the Cod are caught, their heads are cut off; they are opened, gutted, and salted: they are then stowed in the hold of the vessel, in beds five or six yards square, head to tail, with a layer of salt to each layer of fish. When they have lain here three or four days to drain off the water, they are shifted into a different part of the vessel, and again salted. Here they remain till the vessel is loaded. Sometimes they are cut into thick pieces, and packed in barrels, for the greater convenience of carriage.

Cod are caught by the inhabitants of Norway, in strong packthread nets. These have meshes four inches square, and are about a fathom or fifteen meshes deep, and twenty fathoms long. The Norwegians use, according to the weather, from eighteen to twenty-four of these nets joined, so that they have sometimes upwards of four hundred fathoms of net out at a time. They fish in from fifty to seventy fathom water, and mark the places of the nets by means of buoys. The afternoon is the time when the nets are generally set; and, on taking them in on the following morning, it is not unusual to obtain three or four hundred fine Cod.

In the Newfoundland fishery, the *sounds*, or air-bladders, are taken out previously to incipient putrefaction,

are washed from their slime, and salted for exportation. The tongues are also cured, and brought in barrels containing four or five hundred pounds weight each. From the livers a great quantity of oil is extracted.

In Lapland, and some of the districts of Norway, the Cod and Torsk*, which are caught in the winter, are carefully piled up, as they are caught, in buildings constructed for the purpose. Here they remain frozen until the following spring, when the weather becoming more mild, they are removed to another building of similar construction, in which they are prepared for drying. The heads are cut off, the entrails taken out, and the remainder of the body is hung up in the air. Fish caught in the spring are immediately conveyed to the second house, and are dried in the above manner. Those that are caught during the summer can only be preserved by the usual method of curing with salt.

Cod feed principally on the smaller species of fish, on worms, shell-fish, and crabs: and their digestion is sufficiently powerful to dissolve the greatest part even of the shells which they swallow.

They are so extremely prolific, that Leeuwenhoek counted more than nine millions of eggs in the roe of a middling-sized Cod-fish. The production of so great a number will surely baffle all the efforts of man, or the voracity of the inhabitants of the ocean, to diminish the species so greatly, as to prevent its affording an inexhaustible supply of grateful provision in all ages.

In the European seas, the Cod begin to spawn in January, and they deposit their eggs in rough ground among rocks. Some continue in roe until the beginning of April. They recover very quickly after having spawned, and good fish are to be caught all the summer. When Cod are out of season, they are thin-tailed and lousy. They are chosen for the table, by their

* Another species, *gadus callarius*, of Linnæus.

plumpness, and roundness near the tail; by the depth of the hollow behind the head; and by the regular undulated appearance of the sides, as if they were ribbed.

Cod frequently grow to a very great size. The largest that is known to have been taken in this kingdom, was caught at Scarborough, in the year 1755: it measured five feet eight inches in length, and five feet in circumference, and weighed seventy-eight pounds. The usual weight of these fish is from fourteen to forty pounds.

THE HADDOCK*.

Haddocks migrate in immense shoals, which usually arrive on the Yorkshire coasts about the middle of winter. These shoals are sometimes known to extend, from the shore, nearly three miles in breadth, and in length from Flamborough Head to Tinmouth Castle, fifty miles, and perhaps even much further. An idea of the number of Haddocks may be formed from the following circumstance: three fishermen, within a mile of the harbour of Scarborough, frequently loaded their boat with these fish twice a day, taking each time about a ton weight of them. The large Haddocks quit the coast as soon as they are out of season, and leave behind them great abundance of small ones. The former are supposed to visit the coasts of Hamburgh and Jutland during the summer.

The larger Haddocks begin to be in roe in November, and continue so for somewhat more than two months: from this time till May they are reckoned out of season. The small ones are extremely good from May till February; and those that are not old enough to breed, are in season for two months afterwards.

* SYNONYMS. *Gadus æglefinus*. *Linnaeus*.—L'Aigretin, in France.

Haddocks seldom grow to any great size; they very rarely weigh as much as twelve or fourteen pounds; and they are esteemed more delicate eating, when they do not exceed three pounds in weight.

In Greenland, according to the observation of Otho Fabricius, these fish remain near the bottom of the water during the day-time; but, in the evening, they approach the surface. It is then that the fishermen catch them, and generally in immense numbers. Sometimes they may be observed to leap quite out of the water, for the purpose of avoiding dog-fish, and their other enemies of the deep.

In tempestuous weather, Haddocks are said to seek for shelter in the sand or mud, or among sea-weeds. They feed on various small marine animals, and they frequently become fat on herrings.

The females spawn about the month of February, at which time they approach the shores in great numbers, for the purpose of depositing their ova upon the sea-weeds. The males afterwards come separately, in order to render the eggs productive.

On each side of the body, just behind the gills, there is a dark spot. Superstition asserts, that when St. Peter took the tribute-money out of the mouth of a fish of this species, he left the impression of his finger and thumb, which has ever since been continued to the whole race of Haddocks.

THE WHITING*.

It is principally near the bottom of the sea, that the Whiting resides. Here it feeds on various species of crabs and lobsters, on molluscæ, and young fish. In its stomach there are often found both sprats and young herrings. With these the fishermen frequently bait

* SYNONYMS. *Gadus merlangus*. Linn.—Le Gade Merlan. La Cepede.—Le Merlan, in France.

their hooks for the catching of Whittings: they also occasionally bait with marine worms and muscles.

Whittings are generally caught off certain parts of the French coast, in the months of January and February; but, in Holland and England, during the summer season. They sometimes approach the English coasts in such numbers, that their shoals have been known occasionally to extend three or four miles in length, and upwards of a mile in breadth.

They are sometimes caught by means of nets, but lines are generally preferred. Where a fishery is well conducted, these lines are of immense length, and furnished with as many as from a hundred and fifty to two hundred hooks. One vessel will put out twenty of these lines, having in the whole nearly four thousand hooks. Whittings pursue the shoals of herrings with great eagerness; they are, consequently, often caught in the herring-nets.

It is from the end of December until about the beginning of February, that Whittings usually approach the shores, for the purpose of depositing their eggs among the sea-weeds. Towards the latter part of this season, the flesh, which at all other times of the year is tender, white, and well-flavoured, becomes soft and insipid, and the animals themselves are thin and emaciated.

The flesh of the Whiting is, in some countries, considered so easy of digestion, as to be often prescribed to those persons whose digestive powers are much impaired. This quality of the flesh gave rise to an ancient adage, that "the Whiting is never heavier in the stomach than it is when suspended to the waist."

THE LING*, AND HAKE.

After the herring, the pilchard, and the cod, the Ling

* DESCRIPTION. The Ling is usually from three to four feet

may, in a commercial view, be considered as the most important of all fish. Nine hundred thousand pounds weight of Ling are annually exported from Norway. In England these fish are caught and cured in somewhat the same manner as cod. Those which are caught off the shores of America, are by no means so much esteemed as those which frequent the coasts of Great Britain and Norway. And the Ling in the neighbourhood of Iceland are so bad, that the inhabitants are unable to find a sale for them in any country except their own. With us they are chiefly abundant amongst the Hebrides and on the coast of Yorkshire.

Ling generally remain near the bottom of the sea, where they prey on crabs, lobsters, and various small kinds of fish, particularly on plaice and flounders. Bloch found in the stomach of a Ling, several young plaice and gurnards. They spawn about the month of June, depositing their ova in muddy bottoms, and among sea-weed, near the mouths of rivers.

They are in season from February till about the end of May. During this time the liver is white, and yields a great quantity of fine and well-flavoured oil. A kind of isinglass is made from the air-bladders. The tongues are eaten either fresh, dried, or salted.

Hake * are found in the Mediterranean, in the British

in length. The body is slender, and generally of an olive colour above, and white below. On the chin there is a single cirrus or beard; and the lower jaw is shorter than the upper one. There are two dorsal fins, the second of which extends nearly to the tail. The ventral fins are white; and the dorsal and anal fins are edged with the same. The tail is tipped with white, but has a transverse bar of black near the end.

SYNONYMS. *Gadus Molva*. Linn.—Le Lingue. La Cc-pede. Bloch.

* DESCRIPTION. The general length of the Hake, is from two to three feet. The upper parts of the body are cinereous, and the lower parts dirty white. The mouth has no cirrus, and the lower jaw is longer than the upper one. There are

Channel, and in the North Sea. On some of the shores of Ireland, particularly those of Galway and Waterford, they are very abundant. They are also caught in vast quantities near Penzance in Cornwall, and on some parts of the coast of Devonshire.

There are few animals more voracious than these. They pursue, with great eagerness, the shoals of herrings and mackrel; and, when other prey is not easily had, they attack and devour even their own species.

Although the Hake is a fish much esteemed in various parts of the Continent, we have in England so many better kinds, that it is not much regarded. It is, however, dried and salted for exportation to Spain, Portugal, and the Mediterranean. The flesh is white, separates into flakes, but is generally soft, and not well tasted.

The liver of the Hake, which is large, and of a pale yellow colour, was, by the ancients, nearly as much esteemed as that of the mullet.

Thoracic Fish*.

OF THE SUCKING-FISH TRIBE.

The Sucking-fishes have a naked, flat, and oily head, surrounded by a narrow margin, and marked with se-

two dorsal fins, the second of which extends nearly to the tail. The mouth is very wide, and armed with long and sharp teeth,

SYNONYMS. *Gadus merluccius*. Linn.—La Merluche. *La Cepede*. Bloch.

* The fishes of the Linnean order *Thoracici*, have bony gills, and ventral fins before the pectoral ones.

veral transverse streaks or groovess. They have also ten rays in their gill-membrane; and their body is destitute of scales.

There are only three known species; these are occasionally seen in the Mediterranean Sea, and the Pacific Ocean.

THE COMMON REMORA, OR SUCKING-FISH

From the time of Aristotle to the present day, this fish has been an object of constant attention and surprise. The ancient naturalists, not satisfied with imputing to it wonderful qualities, and very extraordinary powers, proceeded so far as even to regard its properties among what they denominated the occult qualities of nature. The Remora, in almost all ages, has ranked high in the writings of poets, in the comparisons of orators, the narrations of travellers, and the descriptions of naturalists.

The ancients absurdly believed that, small as it is, this fish had the power of arresting the progress of a ship in its fastest sailing, by adhering to its bottom.

The sucking-fish beneath, with secret chains,
Clung to the keel, the swiftest ship detains.
The scamen run confused, no labour spared,
Let fly the sheets, and hoist the top-mast yard.
The master bids them give her all the sails,
To court the winds, and catch the coming gales.
But, though the canvass bellies with the blast,
And boisterous winds bend down the cracking mast,
The bark stands firmly rooted in the sea,
And will, unmoved, nor winds nor waves obey:

* See Plate xvi. Fig. 2.

DESCRIPTION. This singular animal is usually about a foot in length, and has sixteen or more furrows on the top of the head. The back is convex and black, and the belly white. The tail is forked.

SYNONYMS. *Echencis remora*. Linn.—La Remore, and Sucet, in France.

Still, as when calms have flatted all the plain,
 And infant waves scarce wrinkle on the main.
 No ship in harbour moor'd so careless rides,
 When ruffling waters tell the flowing tides.
 Appall'd, the sailors stare, through strange surprise,
 Believe they dream, and rub their waking eyes.
 As when, unerring from the huntsman's bow,
 The feather'd death arrests the flying doe,
 Struck through, the dying beast falls sudden down,
 The parts grow stiff, and all the motion's gone;
 Such sudden force the floating captive binds,
 Though beat by waves and urged by driving winds.

It inhabits most parts of the ocean, and is often found so strongly adhering to the sides of sharks and other fish, by means of the process on the upper part of its head, as not to be separated without great difficulty. Five of these fish have been taken off the body of a single shark. St. Pierre says, he has put some of them on an even surface of glass, from which he could not afterwards remove them.

The Indians of Jamaica and Cuba formerly used the Sucking-fish in the catching of others, somewhat in the same manner as hawks are employed by a falconer in seizing birds. They kept them for the purpose, and had them regularly fed. The owner, on a calm morning, would carry one of them out to sea, secured to his canoe, by a slender but strong line, many fathoms in length; and the moment the creature saw a fish in the water, though at a great distance, it would dart away with the swiftness of an arrow, and soon fasten upon it. The Indian, in the mean time, loosened and let go the line, which was furnished with a buoy that floated on the surface of the ocean, and marked the course the Sucking-fish had taken; and he pursued it in his canoe, until he perceived his game to be nearly exhausted. He then, taking up the buoy, gradually drew the line towards the shore; the Sucking-fish still adhering with so inflexible a tenacity to his prey as not easily to be removed.



A. Murray del. & sculp.

1, Sword Fish. 2, Dorso. 3, Chetodon. 4, Tunny. 5, Flying Fish. 6, Skate. 7, Lamprey. 8, Land Crab.

These fish are often eaten, and in taste they are said somewhat to resemble fried artichokes.

OF THE DORÉE TRIBE.

None of the fishes of the present tribe were known to the ancient naturalists, except the Common Dorée. There are about eight species, some of which are found in the European, and others in the American seas. One of them *, which inhabits the fresh waters of India, swims near the surface, like the beaked *Chætodon* †, and catches aquatic insects, by jetting water upon them from its mouth. The wings of the insects are by this means wetted, and they become an easy prey.

THE COMMON OR JOHN DORÉE ‡.

The ancients were well acquainted with the John Dorée: it is expressly mentioned in the writings both of Ovid and Pliny. This fish, and not the haddock, is, by many persons, supposed to have been the same out of the mouth of which the apostle Peter, at the command of our Saviour, took the tribute-money. The indication of this is stated to be a dark spot, somewhat like a finger-mark, on each side of the head. Hence it is called, on the French coasts of the Mediterranean, *le poisson de Saint Pierre*; on the Italian coasts, *Pesce San Pietro*; and in Germany, *St. Peter-fisch*. By the modern Greeks it is denominated the *fish of St. Christopher*, from one of their pious legends relative to that saint.

* *Zeus insidiator*, of Linnaeus.

† *Chætodon jaculator*, of Linnaeus.

‡ See Plate xvii. Fig. 2.

SYNONYMS. *Zeus* Faber. *Linn.*—*Doré*, and *Poule de Mer*, in France.—*Le Zeé Forgeron*. *La Cépède*.

The Dorée is a very voracious animal: it feeds on various species of small fish, which it pursues with great rapidity. It will seize, and almost without discrimination, almost all kinds of baits. The audaciousness of the Dorée ought not to surprise us, when we consider that, independently of the enormous dimensions of its mouth, and the number and strength of its teeth, it has a longitudinal range of strong spines, not only on each side of the dorsal fins, but likewise from the mouth all the way to the second anal fin. These tend to protect it from injury by its enemies of the deep.

When the Dorée is taken alive out of the water, it is able to compress its internal organs so rapidly, that the air, in rushing through the openings of the gills, produces a kind of noise somewhat like that which, on similar occasions, is emitted by the gurnards.

The Dorée is found in the North Sea, in the British Channel, the Mediterranean, and the Atlantic Ocean.

OF THE FLAT-FISH IN GENERAL.

The present tribe comprehends those fish that are usually denominated Flat-fish; such as the Turbot, Plaise, Flounder, Sole, &c. These are generally confined to the muddy or sandy banks of the sea, where they have the power of burying themselves as far as the head, for the purpose of escaping the devastations of the more rapacious tribes. They seldom rise far from the bottom, since, from the want of an air-bladder to buoy them up, which most of the other fishes possess, they are compelled to use their pectoral fins for this purpose, in somewhat the same manner as birds use their wings to rise in the air; and this is not done without considerable exertion. Here, therefore, they generally swim, with their bodies in an oblique position, and feed on such aquatic animals as come in their way.

Many of them, as the Holibut, Turbot, and some others, grow to a large size. The eyes of the whole

tribe are situated on one side of the head. It is a curious circumstance, that, while the under parts of their body are of a brilliant white, the upper parts are so coloured and speckled, as, when they are half immersed in the sand or mud, to render them almost imperceptible. Of this resemblance they are so conscious, that whenever they find themselves in danger, they sink into the mud, and there continue motionless. This is a circumstance so well known to fishermen, that within their palings on the strand they are often under the necessity of tracing furrows with a kind of iron sickle, in order to detect by the touch, what they are not otherwise able to distinguish. Not being rapacious, nor furnished with any weapons of defence, these fishes owe their security to this stratagem; while the thornback and rays, which are carnivorous, and armed with strong spines, although flat-fish of a different class, are marbled with lighter colours, that they may be perceived and avoided by less powerful fish.

THE TURBOT *, AND HOLIBUT †.

The northern parts of the English coast, and some places off the coast of Holland, afford Turbots in greater

† **DESCRIPTION.** Turbots have sometimes been known to weigh from twenty-five to thirty pounds. Their general form is somewhat square. The upper parts of the body and fins are cinereous, with dark spots; and the under parts white. On the upper parts there are numerous short and blunt spines. The eyes are on the left side of the head.

SYNONYMS. *Pleuronectes maximus.* Linn.—Le Turbot. *La Cepede.*—Bret, in some counties of England:—Gunner flook, in Scotland.

† **DESCRIPTION.** The Holibut has been known to attain so great a weight as between two and three hundred pounds. Its general shape is long and narrow. The upper parts are dusky, and the under parts white. The skin is smooth, and destitute of spines. The eyes are on the right side of the head.

SYNONYMS. *Pleuronectes hippoglossus.* Linn.—Le Flétan. *La Cepede.*—Turbot flook, in Scotland.

abundance, and in greater excellence, than any other parts of the world. Lying here, however, in deep waters, they are seldom to be caught but by lines.

In fishing for Turbot off the Yorkshire coast, three men go out in each of the boats, each man furnished with three lines, and every line having two hundred and eighty hooks, placed exactly six feet two inches asunder. These are coiled on an oblong piece of wicker-work, with the hooks baited and placed very regularly in the centre of the coil. When they are used, the nine lines are generally fastened together, so as to form one line, with above two thousand hooks, and extending nearly three miles in length. This is always laid across the current; and an anchor and buoy are fixed at the end of each man's line. The tides run here so rapidly, that the fishermen can only shoot and haul their lines during the still water at the turn of the tide; and therefore, as it is flood and ebb about every alternate six hours, this is the longest time the lines can remain on the ground. When the lines are laid, two of the men usually wrap themselves in the sail and sleep, whilst the third is on watch, to prevent their being run down by ships, and to observe the weather.

The boats used in this work are each about a ton burden; somewhat more than twenty feet in length, and about five in width. They are well constructed for encountering a boisterous sea, and have three pairs of oars, and a sail, to be used as occasion requires. Sometimes larger boats than these are used, which carry six men and a boy. When the latter come to the fishing-ground, they put out two of the smaller boats that they have on board, which fish in the same manner as the three-manned boats do, save that each man is furnished with a double quantity of lines; and, instead of waiting in these the return of the tide, they return to the large boat, and there bait their other lines: thus hauling one set and shooting another, at every turn of the tide. The fishermen commonly run into harbour twice a week, to deliver their fish.

The bait that the Turbots take most readily is a fresh

herring, cut into proper-sized pieces: they are also partial to the smaller lampreys, pieces of haddock, sand-worms, muscles, and limpets; and when none of these are to be had, the fishermen use bullock's liver. The hooks are two inches and a half long in the shank, and nearly an inch wide betwixt the shank and the point. These are fastened to the lines upon snoods of twisted horse-hair, twenty-seven inches in length. The line is made of small cording, and is always tanned before it is used.

The voracity of Turbot, when in pursuit of prey, is often such, that it carries them into the mouths of rivers, or the entrance of ponds in salt-marshes, which communicate with the sea. But they are not contented with merely employing agility and strength in procuring their food, they likewise have recourse to stratagem. They plunge themselves into the mud or sand at the bottom of the sea, and cover their whole body, except their eyes and mouth. Thus concealed, they seize upon and devour all the smaller kinds of fish which incautiously approach them. It is said that they are very particular in the choice of their food, invariably refusing all except living animals, or such as are not in the least degree putrid. And the fishermen assert, that they are never to be caught with baits which have been bitten by other fish.

In many parts of England, Turbot and Holibut are sold indiscriminately for each other. They are, however, perfectly distinct; the upper parts of the former being marked with large, unequal and obtuse tubercles; while those of the latter are quite smooth, and covered with oblong soft scales, that adhere firmly to the body. The eyes of the Turbot also are on the left, whilst those of the Holibut are on the right of the head.

Holibuts are sometimes caught of such immense size, on the northern coasts of England, as to weigh from two to three hundred pounds. Olafsen speaks of having seen one in Iceland, which measured five ells in length.

The Greenlanders employ the membrane of the stomach of the Holibut, in place of glass for their windows.

The Swedes and Icelanders make of these fish what they call *raff* and *ræchel*: the first consists of the fins, with the fat skin to which they are attached; and the latter, of pieces of the flesh cut into stripes. Holibuts, also, are salted in the manner of herrings, which is said to be the best mode of curing them.

These fish spawn in the spring of the year, depositing their ova, which are of a pale red colour, on the shore among rocks and stones.

THE SOLE.*

In the economy of the Soles, we have an account of one circumstance which is very remarkable: among various other marine productions, they have been known to feed on shell-fish, although they are furnished with no apparatus whatever in their mouth for reducing these to a state calculated for digestion. Some Soles that were purchased by Mr. Collinson, had their bellies hard and prominent, and appeared to contain rows of some hard substance. On the fish being opened, these were found to be rows of shell-fish, which, from the bulging of the shells, and the intervening interstices, gave the intestines somewhat the appearance of strings of beads. On further examination, some of them were observed to be nearly dissolved, others partly so, but many of them were whole. The usual food of Soles is the spawn and young of other fish.

Soles are found on all the British coasts; but such as are caught on the western shores are much superior in size to what are taken in the north: they are sometimes found of the weight of six or seven pounds. The principal fishery for Soles is in Torbay.

These fish are in great request for the table, their flesh being more tender and much more generally esteemed, than that either of the plaice or flounder. It has also the quality of keeping sweet and good for several

* SYNONYMS. *Pleuronectes Solea*. Linn.—La Sole and Perdrix de Mer, in France.

days, even in hot weather; and indeed it acquires a more delicate flavour by being thus kept. On this account it is, that Soles, in the London markets, are frequently more esteemed than those which are cooked immediately after they are taken out of the sea.

During the winter season these fish usually retire into the deep water; but at the approach of spring they frequent the sea-shores, and the mouths of rivers. They are usually caught either in trawl-nets on sand-banks out at sea, or with seine nets on the shore.

THE PLAISE* AND FLOUNDER†.

The general habits both of the Plaise and the Flounder, resemble those of all the other flat-fish. These fish are each found in great abundance in most of the European seas. Flounders often ascend rivers, and occasionally even so far as to be beyond the immediate influence of the tides.

The Plaise spawns in the month of February or March, the ova being deposited among the rocks and marine plants. It is generally caught in the same manner as the sole.

These are firm and well-flavoured fish, but they vary much in this respect. The small and thin ones are generally inferior to the others, because their flesh becomes soft and gluey in boiling. They are of a bluish white colour on the under side of their body, whilst those which are in greatest perfection, have a fine red-

* **DESCRIPTION.** The principal distinction between the Plaise and the Flounder, consists in the former having a row of six tubercles behind the left eye, of which the latter is entirely destitute.

SYNONYMS. *Pleuronectus platessa.* *Linnaeus.*—*La Pliè.*
La Cepede.—Pless, in Scotland.

† **SYNONYMS.** *Pleuronectus flesus.* *Linnaeus.*—*Le Flez.*
La Cepede.—Fluke or But, in some parts of England.—Mayoch flook, in Scotland.

dish tinge on this part. In some countries the worst sort are salted, dried in the sun, and afterwards packed for sale. The larger and better kinds are also dried, and when the skin is taken off, it is said that they may be cut and eaten in the manner of cheese.

The best season for *Flounders* is considered to be from the spring to the autumn. The quality of these fish depends much on the place where they are caught, and the quantity and description of food which they are able to obtain. Those that inhabit fresh water, are generally considered the best. In rivers they are most commonly found where the bottom is sandy or muddy. In shallow waters, when they are disturbed, they dart swiftly along the bottom, to the distance of a yard or two, into concealment; and their track is distinctly to be traced by the cloud of mud or sand which they throw up in their progress.

OF THE CHÆTODON TRIBE.

In this tribe, although the species are very numerous, there is only one of which I have met with any account in the least degree interesting.

The head and mouth of the Chætodons are small, and they have the power of pushing out and retracting the lips, so as to make a tubular orifice. The teeth are mostly bristle-shaped, flexile, moveable, closely set, and very numerous. The gill-membrane has from three to six rays. The body is scaly, broad, and compressed; and the dorsal and anal fins are generally terminated with prickles.

THE BEAKED CHÆTODON*.

The Beaked Chætodon or Shooting-fish frequents the shores and mouths of rivers in India, and about the In-

* See Plate xvii. Fig. 3.

DESCRIPTION. This fish is of a whitish or very pale brown

dian islands. It is somewhat more than six inches in length.

This fish feeds principally on flies and other small winged insects that hover about the waters it inhabits; and the mode of taking its prey is very remarkable. When it sees a fly at a distance, on any of the plants in the shallow water, it approaches very slowly, and with the utmost caution, coming as much as possible perpendicularly under the object. Then, putting its body in an oblique direction, with the mouth and eyes near the surface, it remains for a moment immoveable. Having fixed its eyes directly on the insect, it shoots at it a drop of water from its tubular snout, but without showing its mouth above the surface, from whence only the drop seems to rise. This is done with so much dexterity, that though at the distance of four, five, or six feet, it seldom fails to bring the fly into the water. With the closest attention the mouth could never be discovered above the surface, although the fish has been seen to eject several drops one after another, without leaving the place, or in the smallest apparent degree moving its body.

This very singular action was reported to M. Hommel, the governor of the hospital at Batavia, near which place the species is sometimes found; and it so far excited his curiosity, that he was determined, if possible, to convince himself of its truth, by ocular demonstration.

For this purpose, he ordered a large, wide tub to be filled with sea-water: he then had some of these fish caught and put into it; and the water was changed

colour, with commonly four or five blackish bands running across the body, which is ovate and compressed. The snout is lengthened and cylindrical. The dorsal and anal fins are very large, and on the former there is a large eye-like spot.

SYNONYMS. *Chætodon rostratus*. *Linnaeus*.—*Chætodon encladus*. *Shaw*.—*Jaculator*, or *Shooting-fish*. *Phil. Tran.*—*La Boudoulière à bec*, by the French.

every other day. After a while, they seemed reconciled to their confinement; and he tried the experiment. A slender stick, with a fly fastened at the end, was placed in such a manner on the side of the vessel, as to enable the fish to strike it; and it was not without inexpressible delight, that he daily saw them exercising their skill in shooting at it with amazing force, and seldom missing their mark.

The flesh of this species is white and well tasted.

OF THE PERCH TRIBE*.

Of about sixty known species of Perch, the ancients were acquainted only with three. There are about five which are natives of the British rivers and sea-coasts. The voracity of these fishes is boundless. They are also endowed with strong muscular powers of action, and with great activity of body. When seized in the hand, or attacked by an enemy, they erect the spines of their first dorsal fin, and strike them at the intruder with such force and address, as sometimes to cause dreadful lacerations.

THE COMMON PERCH†.

The Common Perch are gregarious; and, contrary to the nature of nearly all fresh-water fish that swim in shoals, they are so voracious as to attack and devour even their own species. They grow slowly, and are seldom caught of extraordinary size. The largest

All the species of Perch have jaws that are unequal in length, armed with sharp-pointed and incurved teeth. The gill-membrane has seven rays; and its cover consists of three plates, the uppermost of which is serrated. The scales that cover the body are hard and rough. The first dorsal fin is spinous, and the second (except in one species) is soft.

† SYNONYMS. *Perca fluviatilis*. Linn.—La Perche. *La Cepede*.—Penn. Brit. Zool. vol. iii. tab. 48.

that was ever heard of in this country, was caught some years ago in the Serpentine River in Hyde Park: it weighed nine pounds. The usual weight is not, however, more than from half a pound to two pounds.

Perch are found in clear, swift rivers, with pebbly or gravelly bottoms, and in those of a sandy or clayey soil. They seem to prefer moderately deep water, and holes by the sides of, or near to gentle streams, where there is an eddy; the hollows under banks, among weeds, and roots of trees; the piles of bridges or ditches, and back streams that have a communication with some river. They also thrive sufficiently well in ponds that are fed by a brook or rivulet. These fish are very tenacious of life. They have been known to survive a journey of near sixty miles, although packed in dry straw.

It is generally believed that a pike will not attack a full-grown Perch: he is deterred from so doing, by the spiny fins of its back, which this fish always erects at the approach of an enemy. The smaller Perch, however, are frequently used as bait for pike.

The season of angling for Perch, is from April to January; and the time from sunrise till ten o'clock, and from two o'clock till sunset: except in cloudy weather, with a ruffling south wind, when they will bite all day. The baits are various kinds of worms, a minnow, or grass-hopper. So voracious are these fish, that it is said, if an expert angler find a shoal of them, he may catch every one. If, however, a single fish escape that has felt the hook, all is over: this fish becomes so restless, as soon to occasion the whole shoal to leave the place.

In winter the Perch is exceedingly abstemious, and during that season it scarcely ever takes a bait, except in the middle of a warm sunny day. In clear weather during the spring, sometimes a dozen or more of these fish may be observed in a deep hole, sheltered by trees and bushes. The angler may then observe them striving which shall first seize his bait, till the whole shoal are caught.

The females deposit their spawn, sometimes to the amount of 280,000 ova, betwixt the months of February and May. This is usually done during the act of rubbing themselves against some sharp body.

Perch are much admired, as firm and delicate fish. They were in high esteem among the Romans.

In one of the pools of Merionethshire there is a singular *variety* of the Perch, the back of which is hunched, and the lower part of the back-bone next the tail is strangely distorted. The common kind are as numerous in this pool as the deformed fish. Some of the crooked Perch have likewise been found in the small alpine lakes of Sweden.

OF THE STICKLEBACKS IN GENERAL*.

The Sticklebacks are not a very numerous tribe. The species, however, are dispersed over various parts of the world. Some of them inhabit fresh waters, and others are confined to the ocean.

THE THREE-SPINED STICKLEBACK†.

These little fish, which seldom exceed two inches in length, are very common in many of our rivers. They have three sharp spines on their back, which are their instruments both of offence and defence, and are always erected on the least appearance of danger, or whenever they are about to attack other fish. The body near the

* In the Sticklebacks the head is somewhat oblong and smooth, having the jaws armed with minute teeth. The gill-membrane has either three, six, or seven rays. The body is keel-shaped towards the tail, and covered with bony plates. On the back, betwixt the dorsal fin and the head, are several sharp spines.

† SYNONYMS. *Gasterosteus aculeatus*. Linn.—Stickle-back, Bansticle, Sharpling. *Willughby's Ich.*—Prickle-back, Prickle-bag. *Phil. Tran.*—*Penn. Brit. Zool.* vol. iii. tab. 50.

tail is somewhat square, and the sides are covered with transverse bony plates.

By feeding with great voracity on the fry and spawn of other fish, the Sticklebacks, notwithstanding the smallness of their size, are greatly detrimental to the increase of almost all the species among which they inhabit. One that Mr. Arderon of Norwich had in a glass, devoured in five hours no fewer than seventy-four young dace, each about an inch and a half long, and of the thickness of a horse-hair.

The above-mentioned Stickleback was put by Mr. Arderon into a glass jar of water, with sand at the bottom, for the purpose of trying some experiments on it, as well as for the purpose of ascertaining its manners, as far as possible, in a confined state. For a few days it refused to eat; but, by frequently giving it fresh water, and by coming often to it, it began to eat the small worms that were now and then thrown into the jar. Soon afterwards it became sufficiently familiar to take them from the hand; and at last it was so bold, as, when satiated, or when it did not like what was offered, to set up its prickles, and strike with its utmost strength at the fingers. It would suffer no other fish to live in the same jar, but invariably attacked whatever were put in, though ten times its own size. One day, by way of diversion, a small fish was put to it. The Prickleback immediately assaulted and put it to flight, tearing off part of its tail in the conflict; and had they not been then separated, he would undoubtedly have killed it.

Small as these animals are, they are sometimes so numerous, as to be obliged to colonize, and leave their native places in search of new habitations. Once in every seven or eight years they appear in the river Welland, near Spalding in Lincolnshire, in such amazing shoals, as, during their progress up the stream, to appear in a vast body, occupying the whole width of the river. These are supposed to be the overplus of multitudes collected in some of the fens. When this hap-

pens, they are taken as manure for the land; and an idea may be formed of their numbers, from the circumstance that a man, who was employed by a farmer to catch them, earned, for some time, four shillings a day, by selling them at a halfpenny a bushel.

The great exertions they use, in getting from one place to another, where obstacles intervene, are very extraordinary; for though the largest amongst them is seldom known to be more than two inches in length, they have been seen to spring a foot and a half, (nine times their own length,) in perpendicular height from the surface of the water, and in an oblique direction much further.

They spawn in April and June, on the aquatic plants; and are very short-lived, scarcely ever attaining their third year. They are too small, and perhaps too bony, to be of any service as food to mankind; but in some parts of the Continent they are of considerable use in fattening ducks and pigs.

OF THE MACKREL TRIBE.*

Nearly all the species of Mackrel are gregarious, and unite in immense shoals. Some of them are migratory, making long voyages at certain seasons of the year. It is believed that they are all eatable; and some of them are well known to be exceedingly delicate food. They afford employment and support to numerous fishermen in various countries of Europe. There are in the whole about twenty-five species, of which four are found on the British coasts.

* The fish which constitute the present tribe have a smooth body, and seven rays in their gill-membrane. Between the dorsal fin and the tail, there are several small or spurious fins.

THE COMMON MACKREL*.

From the elegance of its shape, and the brilliancy of its colours, the Mackrel, when alive, is one of the most beautiful fish that frequents our coasts. Death, in some measure, impairs the colours, but it by no means obliterates them.

Mackrel visit our shores in vast shoals; but, from being very tender and unfit for long carriage, they are found less useful than other gregarious fish. In some places they are caught by lines from boats; for during a fresh gale of wind they readily seize a bait. The usual bait is a bit of red cloth or a piece of the tail of a Mackrel. It is necessary that the boat should be in motion, in order to drag the bait along near the surface of the water. The great fishery for Mackrel is in some parts of the west coast of England. This is of such an extent as to employ, in the whole, a capital of nearly 200,000*l*. The fishermen go out to the distance of several leagues from the shore, and stretch their nets, which are sometimes several miles in extent, across the tide, during the night. The meshes of these nets are just large enough to admit the heads of tolerably large fish, and to catch them by the gills. A single boat has been known to bring in, after one night's fishing, a cargo that has been sold for nearly seventy pounds. Besides these, there is, in the west of England, another mode of fishing for Mackrel with a *ground seine*. A coil of rope, about two hundred fathoms in length, with the net fastened to one end, is tied, at the other, to a post or rock, on the shore. The boat is then rowed to the extremity of this coil, when a pole, fixed there, and leaded heavily at the bottom, is thrown overboard. The rowers, from this place, make as nearly as possible

* **SYNONYMS.** *Scomber scomber*. *Linnaeus*.—Mackrell, or Mackarel. *Will. Ich.*—*Penn. Brit. Zool.* vol. iii. tab. 51.—*Le Maquereau*, by the French.

a semicircle, two men continually and regularly putting the net into the water. When they come to the other end of the net, where there is another leaded pole, they throw that overboard. Another coil of rope, similar to the first, is by degrees thrown into the water, as the boatmen make for the shore. The boat's crew now land, and, with the assistance of persons stationed there, haul in each end of the net till they come to the two poles. The boat is then again pushed off towards the centre of the net, in order to prevent the more vigorous fish from leaping over the corks. By these means, three or four hundred fish are often caught at one haul.

Mackrel are said to be fond of human flesh. Pontoppidan informs us, that a sailor, belonging to a ship lying in one of the harbours on the coast of Norway, went into the water to wash himself; when he was suddenly missed by his companions. In the course of a few minutes, however, he was seen on the surface, with vast numbers of these fish fastened on him. The people went in a boat to his assistance; and though, when they got him up, they forced with some difficulty the fishes from him, they found it was too late; for the poor fellow, very shortly afterwards, expired.

The roes of Mackrel are used in the Mediterranean for *caviar*. The blood and slime are first washed off with vinegar, and the sinews and skinny parts are taken away. They are then spread out for a short time to dry, and are afterwards salted and hung up in a net, to drain some of the remaining moisture from them. When this is finished they are laid in a kind of sieve, till thoroughly dry and fit for use. In Cornwall and on several parts of the Continent, Mackrel are preserved by pickling and salting. Their greatest weight seldom exceeds two pounds, though some have been seen that weighed more than five. Their voracity has scarcely any bounds; and when they get among a shoal of herrings, they make such havock as frequently to drive it away. They are very prolific, and deposit

their spawn among the rocks near the shore, about the month of June. They die almost immediately after they are taken out of the water, and for a short time exhibit a phosphoric light.

In spring their eyes are covered with a white film, that grows in the winter, and is regularly cast at the beginning of summer. During this time they are said to be nearly blind.

The celebrated *garum* of the Romans was a pickle prepared from this fish.

THE THUNNY*.

On the coast of Sicily, as well as in several other parts of the Mediterranean, there are very considerable Thunny fisheries. The nets are spread over a large space of sea, by means of cables fastened to anchors, and they are divided into several compartments. A man, placed upon the summit of a rock high above the water, gives the signal of the fish being arrived; for he can discern from that elevation what passes under the water, much better than any person near the surface. As soon as notice is given that a shoal of fish has penetrated as far as the inner compartment of the net, the passage is drawn close, and the slaughter begins.

Thunnies enter the Mediterranean about the vernal

* See Plate xvii. Fig. 4.

DESCRIPTION. These fish are from two to ten feet in length. The body is round and thick, and tapers nearly to a point both at the head and tail. The skin of the back is very thick and black, and that of the sides and belly is silvery, tinged with light blue and pale purple. The tail is crescent-shaped, with the tips far asunder; and the spurious fins between the dorsal fin and the tail are from eight to eleven in number.

SYNONYMS. *Scomber Thynnus*. Linn.—Albicore. Var.—Mackrel-sture, or Great Mackrel, in Scotland.—Tunny Fish, or Spanish Mackrel. Will. Ich.—Penn. Brit. Zool. vol. iii. tab. 52.—Le Thon, in France.

equinox, travelling in a triangular phalanx, so as to cut the waters with its point, and to present an extensive base for the tides and currents to act against, and impel forwards.

They repair to the warm seas of Greece to spawn, steering their course thither along the European shores; but as they return they approach the African coast: the young fry is placed in the van of the squadron as they travel. They come back from the east in May, and, about that time, they abound on the coasts of Sicily and Calabria. In autumn they steer northward, and frequent the neighbourhood of Amalphi and Naples. They are not uncommon on the western coasts of Scotland, where they come in pursuit of the herrings, and often, during the night, strike into the nets, and do considerable damage. When the fishermen draw these up in the morning, the Thunny rises at the same time towards the surface, ready to catch the fish that drop out. On the Thunny being observed, a line is thrown into the water, having a strong hook baited with a herring, which it seldom fails to seize. As soon as the fish finds itself ensnared, it seems to lose all its active powers, and after very little resistance, submits to its fate.

The quantity of these fish that is annually consumed in the two Sicilies, almost exceeds the bounds of calculation. When caught in May they are full of spawn, and are then esteemed unwholesome, as being apt to occasion headaches and vapours: to prevent these bad effects, the natives fry them in oil, and afterwards salt them. The pieces, when fresh, appear exactly like raw beef; but when boiled they turn pale, and have somewhat the flavour of salmon. The most delicate parts are those about the muzzle. Those fish which the inhabitants are not able to use immediately, are cut into slices, salted, and preserved in large tubs, either for sale or winter provisions.

The Thunny was a fish so well known to the an-

cients, as to form a principal article of their commerce. By the Romans it was held in great estimation.

OF THE SURMULLETS IN GENERAL*.

By the ancient Greeks and Romans, Surmullets were held in the highest esteem for the table. Pliny was acquainted with two species; and the principal distinction of habit that he has mentioned is, that one of them subsists on living animals, and the other on marine plants. This distinction, however, is by no means correct, since not only the mouth, but also the digestive organs, are precisely the same in each; consequently, their food is necessarily the same also.

There are several species, of which two only are British. They feed on other fish, on testaceous animals, crabs, and putrid bodies which they find floating in the ocean. None of them are known to inhabit fresh waters.

THE RED SURMULLET† AND STRIPED SURMULLET.

Few fish have attained greater celebrity for beauty of appearance, or as constituting a delicious food, than these. From the enormous price at which they were sold among the ancient Romans, they could only be

* The head of these fishes is compressed, sloping, and covered with scales. The eyes are oblong, approximate, and vertical. The jaws and palate are armed with small teeth. The gill-membrane has three rays. The body is round, long, and covered with large scales, which easily drop off.

† DESCRIPTION. This fish seldom exceeds the length of eight or nine inches. The head is large, broad, and compressed at the sides, having two cirri, or beards, near the extremity of the lower jaw. The body is thick in its fore part, compressed, and covered with large scales. The back and the sides are red; the belly is silvery, and the fins are yellow.

SYNONYMS. *Mullus barbatus*. *Linnaeus*.—Le Rouget. *La Cepede*.—Barbet, and Petit Surmullet, in France.

procured by the most wealthy of the inhabitants. Pliny assures us, that one of the Roman consuls paid, for a single Surmullet, a sum equal to nearly sixty-five pounds of our money; and, according to Suetonius, one of the emperors purchased three of them for 30,000 sesterces, or about two hundred and forty-two pounds. To such an absurdity of luxury and ostentation did the Romans arrive, previously to the dissolution of their empire.

At Constantinople the markets are generally well supplied with these fish, which are very common both in the Bosphorus and Black Sea. In the Crimea, they are so much esteemed as to have the name of *Sultan balik*, or Sultan fish. Their flesh is white, firm, well-tasted, and easy of digestion. The parts principally in esteem with the ancients, were the head and the liver. The Red Surmullet is a predatory and voracious fish, feeding, with great eagerness, on marine crustaceous animals. It frequents the sea-coasts more than the open sea, and generally swims in extensive shoals.

In most of their habits, the *Striped Surmullet** resemble the last species. They usually swim in vast shoals; and, in the spring of the year, deposit their eggs at the bottom of the sea, near the mouths of great rivers. By the ancients they were supposed to spawn three times in the year.

Their flesh is firm and excellent. They are caught in several ways; by means of nets, osier baskets, and lines baited with pieces of lobster or crab. As the flesh soon putrifies, these fish, in many countries, are boiled in salt water immediately after they are caught: they are then dredged thickly over with flour,

* DESCRIPTION. The Striped Surmullet is distinguished by having four longitudinal yellow lines along its sides.

SYNONYMS. *Mullus surmuletus*. *Linnaeus*.—Le Surmullet. *L'Espece*.

and enclosed in a paste, for the purpose of preventing the bad effects of contact with the air.

OF THE GURNARDS IN GENERAL*.

These are carnivorous and predatory fish. They inhabit not only the North Sea and the Baltic, but are also found in the Mediterranean, and in various parts of the ocean. When taken alive out of the water, they erect their sharp dorsal fin, and attempt to inflict a wound by means of their spines. These are their weapons of defence against their enemies of the ocean. When taken up they compress their bodies, and, in expelling the air through their gills they make a singular kind of noise: hence the French have given to them the appellation of *Grondins*, or grumblers.

THE GRAY GURNARD†, AND RED GURNARD.

About the months of May and June the Gray Gurnards approach the sea-shores in considerable shoals, for the purpose of depositing their spawn upon

* In the Gurnards the head is large, and covered with strong bony plates. The eyes are large, round, and vertical. The mouth is large; and the palate and jaws are armed with sharp teeth. The gill-membrane has seven rays. The back has a longitudinal, spinous groove on each side. There are slender, articulate appendages at the base of each pectoral fin.

† DESCRIPTION. The Gray Gurnard usually measures from one to two feet in length. The extremity of the head in front is armed on each side with three short spines. The forehead and the covers of the gills are silvery; and the latter are finely radiated. At the end of each gill-cover there is a strong, sharp, and long spine; and beneath that, and just above the pectoral fins, there is another. The body is covered with small scales; the upper parts are of a deep gray, spotted with white and yellow, and sometimes with black; and the lower parts are silvery. The lateral line, which is composed of large

the shallows. They are occasionally found on most of the shores of Great Britain and Ireland.

They chiefly reside in the depths of the ocean, where they have a plentiful supply of food, in crabs, lobsters, and shell-fish, on which it is supposed they, for the most part, feed.

Their flesh is firm, white, and good, though many persons consider it somewhat insipid. They are easily caught by lines, baited with a piece of a fish, or a bit of red cloth; but the most general mode in which they are caught, is with nets.

Whilst it is in the water, the colours of the *Red Gurnard** are, almost beyond conception, brilliant and beautiful, particularly in the broad glare of sunshine, as they then vary, in the most pleasing manner, with every motion of the fish.

There are few of the residents of the ocean so voracious as this; for it devours, with eagerness, almost every thing eatable that comes in its way. Its habits are nearly similar to those of the last species; and it deposits its spawn about the same season, and in similar situations.

Its flesh is considered much more excellent than that of the Gray Gurnard, being more tender, and more firm. The season in which it is in greatest perfection,

and rough scales, is black in the middle and white at the edges.

SYNONYMS. *Trigla gurnardus*. *Lin.*—*La Trigle gurneau*. *La Cepede*.—Crooner, in Scotland.—Knoud, in Ireland.

* DESCRIPTION. On each side of the nose there are two short spines; and the spines on the gill-covers are longer and more slender than in the last species. The general colour of the body is red; and the pectoral fins are edged with purple. The lateral line is silvery, bordered with black, and much narrower in proportion, than in the Gray Gurnard.

SYNONYMS. *Trigla cuculus*. *Lin.*—*La Trigle grondin*. *La Cepede*.—*Le Rouget, ou Rouget Grondin*. *Bloch*.—*Bellicant gurneau*, in France.—*Gowrie*, in Scotland.—*Rocket*, in some parts of England.

is from about the beginning of May until the end of July.

Abdominal Fish*

OF THE SALMON TRIBE†.

Rapid and stony rivers, where the water is free from mud, are the favourite places of most of the Salmon tribe. Some of them do indeed inhabit the sea; but they come up the rivers for the purpose of depositing their spawn in the beds of gravel; and in this instinctive pursuit they are able to surmount wonderful obstacles that oppose their course. After spawning, they return to the sea lean and emaciated. The whole tribe is supposed to afford wholesome food for mankind.

THE COMMON SALMON‡.

This fish seems, in a great measure, confined to the northern seas, being unknown in the Mediterranean, and in the waters of other warm climates. It lives in fresh as well as in salt waters, forcing itself in autumn up the rivers, sometimes for hundreds of miles, for the purpose of depositing its spawn. In these peregrina-

* The fishes of the Linnean order *Abdominales*, have bony gills, and ventral fins placed behind the thorax.

† These fish are distinguished from all others, by having two dorsal fins, of which the hindmost is fleshy and without rays. They have teeth both in the jaws and on the tongue; and the body is covered with round and minutely striated scales.

‡ SYNONYMS. Salmon Salar. *Linn.*—Le Saumon, by the French.

tions it is that Salmon are caught in the great numbers that supply our markets and tables. Intent only on the object of their journey, they spring up cataracts, and over other obstacles of very great height. This extraordinary power seems to be owing to a sudden jerk which the fish gives to its body, from a bent into a straight position. When they are unexpectedly obstructed in their progress, they swim a few paces back, survey the object for some minutes motionless, retreat, and again return to the charge; then, collecting all their force, with one astonishing spring they overleap every obstacle. Where the water is low, or where sand-banks intervene, they throw themselves on one side, and in that position soon work themselves over into the deep water beyond. On the river Liffey, in Ireland, there is a cataract about nineteen feet high: here, in the Salmon season, many of the inhabitants amuse themselves in observing the fish leap up the torrent. They frequently fall back many times before they surmount it; and baskets, made of twigs, are placed near the edge of the stream, to catch them in their fall. At the falls of Kilmorack, in Scotland, where the Salmon are very numerous, it is a common practice with the country people to lay branches of trees on the edges of the rocks: by this means they sometimes catch such of the fish as miss their leap, which the foaming of the torrent not unfrequently causes them to do. And the late Lord Lovat, who often visited these falls, taking the hint from this circumstance, formed a determination to try a whimsical experiment on the same principle. Alongside one of the falls he ordered a kettle full of water to be placed over a fire; and many minutes had not elapsed before a large Salmon made a false leap, and fell into it. This may seem incredible to those who never saw one of these rude salmon-leaps: but surely there is as great a chance of a Salmon falling into a kettle, as on any given part of the adjacent rock; and it is a thing that would certainly take place

many times in the course of the season, were but the experiment tried.

When the Salmon have arrived at a proper place for spawning in, the male and female unite in forming, in the sand or gravel, a proper receptacle for their ova, about eighteen inches deep: this they are also supposed afterwards to cover up. In this hole the ova lie until the ensuing spring, (if not displaced by the floods,) before they are hatched. The parents, however, immediately after their spawning, and extremely emaciated, hasten to the salt water. Toward the end of March the young fry begin to appear; and, gradually increasing in size, they become, in the beginning of May, five or six inches in length, when they are called *Salmon-smelts*. They now swarm, in myriads, in the rivers; but the first flood sweeps them down into the sea, scarcely leaving any behind. About the middle of June the largest of these begin to return into the rivers: they are now become of the length of twelve or sixteen inches. Towards the end of July they are called *Gilse*, and weigh from six to nine pounds each.

When Salmon enter the fresh waters, they are always more or less infested with a kind of insect called the salmon-louse*; and when these are numerous, the fish are esteemed in high season. Soon after the Salmon have left the sea, the insects die and drop off.

Salmon become lean after the spawning-time, but they soon acquire their proper bulk when they return to the sea. Their food consists of the smaller fishes, insects, and worms; for all these are used with success as baits, by the anglers for Salmon.

The principal Salmon-fisheries in Europe are in the rivers, or on the sea-coasts adjoining to the large rivers of England, Scotland, and Ireland. The chief English rivers in which Salmon are caught, are the Tyne, the Trent, the Severn, and the Thames. These fish are

* *Lernæa salmonea*, of Linnæus.

sometimes taken in nets; and sometimes by means of locks or weirs, with iron or wooden grates, so placed at an angle, that, being impelled by any force in a direction contrary to that of the stream, they open, let the fish (or whatever else pushes against them) through, and again, by the force of the water or their own weight, close and prevent their return. Salmon are also killed in still water, by means of a spear with several prongs, which the fishermen use with surprising dexterity. When this is used in the night, a candle and lantern, or a wisp of straw set on fire, is carried along, to the light of which the fish collect.

In the river Tweed, about the month of July, the capture of Salmon is astonishing: often a boat-load, and sometimes nearly two may be taken at a tide; and, in one instance, more than seven hundred fish were caught at a single haul of the net. From fifty to a hundred at a haul are very common. Most of those that are taken before the setting-in of the warm weather, are sent fresh to London, if the distance will permit. The others are salted, pickled, or dried, and are sent off in barrels, in quantities sufficient not only to stock the London markets, but also some of the markets of the Continent.

The season for fishing commences in the Tweed on the thirtieth of November, and ends about old Michaelmas-day. On this river there are about forty considerable fisheries, which extend, upwards, about fourteen miles from the mouth; besides many others of less consequence. These, several years ago, were let at more than the annual rent of ten thousand pounds; and to defray this expense, it has been calculated that upwards of 200,000 Salmon must be caught there, one year with another.

The Scotch fisheries are very productive; as are also several of those in Ireland, particularly that at Cranna, on the river Ban, about a mile and a half from Coleraine. At this place, in the year 1760, as many as three hundred and twenty tons of Salmon were taken.

A person of the name of Graham, who farmed the sea-coast fishery at Whitehaven, adopted a successful mode of taking Salmon, which he appropriately denominated *Salmon-hunting*. When the tide is out, and the fish are left in shallow waters, intercepted by sand-banks, near the mouth of a river, or when they are found in any inlets up the shore, where the water is not more than from one foot to four feet deep, the place where they lie is to be discovered by their agitation of the pool. This man, armed with a three-pointed barbed spear, with a shaft fifteen feet in length, would mount his horse, and plunge at a swift trot, or moderate gallop, belly deep, into the water. He made ready his spear with both hands: when he overtook the Salmon, he let go one hand, and with the other struck the spear, with almost unerring aim, into the fish. This done, by a turn of the hand, he raised the Salmon to the surface of the water, turned his horse's head to the shore, and ran the Salmon on dry land without dismounting. This man said, that he could kill from forty to fifty in a day: ten were, however, no despicable day's work for a man and horse.

Salmon are cured by being split, rubbed with salt, and put in pickle, in tubs provided for the purpose, where they are kept about six weeks: they are then taken out, pressed, and packed in casks with layers of salt.

Different species of Salmon come in such abundance up the rivers of Kamtschatka, as to force the waters before them, and even to dam up the stream so as sometimes to make them overflow their banks. In this case, when the water finds a passage, such multitudes are left on the dry ground, as (if it were not for the violent winds which are prevalent in that country, assisted by the bears and dogs) would soon produce a stench sufficiently great to cause a pestilence.

Salmon are said to have an aversion to any thing red: hence the fishermen are generally careful not to

wear jackets or caps of that colour. Pontoppidan says also, that they have so great a dislike to carrion, that, if any happen to be thrown into the places where they are, they immediately forsake them.

THE SALMON OR SEA TROUT*.

Like the Salmon, this fish is an inhabitant of the sea, but in the months of November and December it enters the rivers, in order to deposit its ova; and, consequently, during the spawning season, it is occasionally found in lakes and streams, at a great distance from the sea.

It feeds on aquatic insects, worms, and small fish, and is often caught by anglers, either with real or artificial flies. The fishing for Salmon-trout, with nets, generally commences towards the end of April, or the beginning of May; but they are considered in highest season about Michaelmas. So little tenacious are they of life, that they die almost as soon as they are taken out of the water.

The flesh of this Trout is red and of excellent flavour, but, like that of the Salmon, the goodness varies according to the quality of the water in which they are caught. On this also depends the greater or less brilliancy and beauty of their colour. In muddy or putrid waters, they generally become insipid and unpalatable. These fish chiefly delight in large rivers, where the stream is rapid, and the bottom is either of sand or gravel.

In countries where they are caught in great quantities, Salmon-trout are cured in several ways, by pickling, salting, or smoking. And, thus preserved, they form a considerable branch of commerce. The mode

* SYNONYMS. *Salmo trutta*. Linn.—La Truite-saumone. Bloch.—Truite de mer, in some parts of France.—Bull-trout, Scurf, and Budge, in some parts of England.

of smoking them is as follows. The fishermen take a tub without a bottom, and pierced all round the sides and at the top with holes. This they raise on three stones, and, suspending the Trouts in the interior, they expose them, for three days, to the smoke of burning oak branches and juniper berries, which are lighted beneath them.

THE COMMON OR RIVER TROUT*.

Though this is a delicate and excellent fish for the table, it was in no esteem among the ancients. It abounded in most of the lakes of the Roman empire, yet is only mentioned by writers on account of its beautiful colours.

In some rivers, Trouts begin to spawn in October; but November is the chief month of spawning. About the end of September they quit the deep water, to which they had retired during the hot weather, and make great efforts to gain the course of the currents, and seek out a proper place for depositing their ova. This is always done on a gravelly bottom, or where gravel and sand are mixed among stones, near the end or sides of streams. At this period they turn black about the head and body, and become soft and unwholesome. They are never good when they are full of roe: which is contrary to the nature of most other fish. After having spawned they become feeble, their bodies are wasted, and those beautiful spots, which before adorned them, are imperceptible. Their heads appear swelled, and their eyes are dull. In this state they seek still waters, and continue there sick, as it is supposed, all the winter. There are in all Trout-rivers some barren female fish, which continue good through the winter.

* **SYNONYMS.** *Salmo fario.* Linn.—Salar, of the ancient writers.—La Truite. Bloch.

In March, or sometimes earlier, if the weather be mild, the Trouts begin to leave their winter quarters, and approach the shallows or tails of streams, where they cleanse and restore themselves. As they acquire strength they advance still higher up the rivers, till they fix on their summer residence, for which they generally choose an eddy behind a stone, a log, or bank, that projects into the water, and against which the current drives. They also frequently get into holes under roots of trees, or into deeps that are shaded by boughs and bushes.

These fish are said to be in season from March to September. They are, however, fatter from the middle to the end of August than at any other time.

Trouts in a good pond will grow faster than in some rivers; and a gentleman who kept them in ponds, for the purpose of ascertaining the progress and duration of their lives, asserts, that at four or five years old they were at their full growth. For three years subsequently to this they continued with little alteration in size; two years afterwards the head appeared to be enlarged, and the body wasted; and in the following winter they died. According to this computation, nine or ten years seem to be the term of their existence.

In several of the northern rivers, Trouts are taken as red and as well-tasted as charr; and, when potted, their bones dissolve like those of charr. These are often very large: one of them was caught some time ago, that measured twenty-eight inches in length. A Trout was taken in the river Stour, in December, 1797, which weighed twenty-six pounds; and another, some years ago, in Lough Neagh, in Ireland, that weighed thirty pounds.

This fish is not easily caught with a line, being at all times exceedingly circumspect. The baits used are worms or artificial flies. The season for fishing is from March till Michaelmas. The angler prefers cloudy weather, but he is not particular as to the time of day.

In two or three of the pools in North Wales, there is found a *variety* of the Trout which are naturally deformed, having a singular crookedness near the tail. Some of the perch in the same country have a similar deformity. In two or three of the lakes of Ireland, there is another* variety called the *Gillaroo Trout*. The stomachs of these Trouts are so excessively thick and muscular, as to bear some resemblance to the organs in birds, called gizzards. These stomachs are sometimes served up to table as *Trouts' gizzards*. In the common Trout the stomach is uncommonly strong and muscular; for the animals live not only on small fish and aquatic insects, but also on the shell-fish of fresh waters; and they even take into their stomachs gravel and small stones, to assist in comminuting the testaceous part of their food.

THE SMELT*.

It is generally considered that the smell of this elegant little fish somewhat resembles that of cucumbers newly cut. From its very peculiar scent, so unlike that of any other species of fish, we give to it the denomination of Smelt, or "smell it." The Germans call it *Stinckfisch*.

The best season for these fish is from December to May, when they approach the shores, and even ascend the rivers in immense shoals. Their usual season of spawning is about the months of March and April. In certain rivers, Smelts appear a long time before they spawn, and in others it has been remarked that they do not at all appear, so long as there is any snow-water floating down. After they have deposited their ova, they return to the sea, and they are not again found in the rivers until the ensuing season. In the Thames they are caught in great numbers from No-

* SYNONYMS. *Salmo eperlanus*. Linn.—L'Eperlan. Bloch.

vember to January. They ascend the river Nyne in Northamptonshire, in the month of March, and have been caught there in great abundance, particularly above Allerton and Castor.

In many parts of Scotland, Smelts are taken by means of poke-nets, tied between two poles, and anchored at the extremity. The ebbing of the tide forces the fish into them, and at low water the nets are taken up and emptied.

Smelts are found on the coasts of all the northern countries of Europe, and even in the Mediterranean. They vary considerably in size. Mr. Pennant states, that the largest he had ever heard of, measured thirteen inches in length, and weighed half a pound.

The ancient writers strongly recommend these fish as food for sick persons: they considered them to be peculiarly wholesome, and easy of digestion. To oil made from the fat of the Graylings, they attributed the property of obliterating the marks of small-pox, freckles, and other spots on the skin. The season of the year during which these fish are considered in greatest perfection, is from September to January.

Grayling delight chiefly in rapid streams, where they afford great amusement to the angler. They are very voracious, and rise eagerly to the fly. They are bolder fish than trout, and even if missed several times successively they will still pursue. So rapid are their motions in the water, that their name of Umber has been thence derived. Ausonius says of them,

“The Umbra swift, escapes the quickest eye.”

* SYNONYMS. *Salmo thymallus*. Linn.—Le Corégone thymalle. *La Cepede*.—L'Ombre d'Auvergne. *Bloch*.

They feed principally on worms, insects, and water-snails; and the shells of the latter are often found in great quantity in their stomachs. They spawn in the months of April and May. The largest fish of this species that I have heard of, was one caught in the Severn, which weighed five pounds.

The stomach of the Umber is so hard and thick, that it feels to the touch almost like cartilage. Linnæus asserts, that the inhabitants of Lapland employ the entrails of these fish as rennet, in the making of cheese from the milk of rein-deer.

OF THE PIKE TRIBE*.

It does not appear that more than three species of Pike were known to the ancients. The species at present known, are fifteen in number, of which four are natives of the British shores and rivers. They are all predatory fish, but few of them are so voracious as the common Pike. They multiply fast, and increase rapidly in size. Their velocity in the water is very great, and their general muscular powers are beyond those of most other fish.

THE COMMON PIKE†.

There is scarcely any fish of its size in the world, that in voracity can equal the Pike. One of these fish has

* In the whole of the Pike tribe the head is somewhat flat, and the upper jaw shorter than the other. The gill membrane has from seven to twelve rays. The body is long, slender, compressed at the sides, and covered with hard scales. The dorsal fin is situated near the tail, and generally opposite to the anal fin.

† See Plate xvi. Fig. 3.

SYNONYMS. *Esox lucius*. Linnæus.—Pike, or Pickerell. Will. Ich.—Penn. Brit. Zool. vol. iii. tab. 63.—Le Brochet, in France.

been known to choke itself in attempting to swallow another of its own species, that proved too large a morsel: and it has been well authenticated, that in Lord Gower's canal at Trentham, a Pike seized the head of a swan as she was feeding under water, and gorged so much of it, as to kill them both.

"I have been assured (says Walton) by my friend Mr. Seagrave, who keeps tame otters, that he has known a Pike, in extreme hunger, fight with one of his otters for a carp that the otter had caught, and was then bringing out of the water.

Boulker, in his *Art of Angling*, says, that his father caught a Pike, which he presented to Lord Cholmondeley, that was an ell long, and weighed thirty-five pounds. His Lordship directed it to be put into a canal in his garden, which at that time contained a great quantity of fish. Twelve months afterwards the water was drawn off, and it was discovered that the Pike had devoured all the fish except a large carp, that weighed between nine and ten pounds; and even this had been bitten in several places. The Pike was again put in, and an entire fresh stock of fish for him to feed on: all these he devoured in less than a year. Several times he was observed by workmen who were standing near, to draw ducks and other water-fowl under water. Crows were shot and thrown in, which he took in the presence of the men. From this time the slaughtermen had orders to feed him with the garbage of the slaughter-house; but, being afterwards neglected, he died, as it is supposed, from want of food.

In December, 1765, a Pike was caught in the river Ouse, that weighed upwards of twenty-eight pounds, and was sold for a guinea. When it was opened, a watch with a black riband and two seals were found in its body. These, it was afterwards discovered, had belonged to a gentleman's servant who had been drowned in the river about a month before.

Gesner relates, that a famished Pike, in the Rhone, seized the lips of a mule, and was, in consequence,

dragged out of the water; and that people, while washing their legs, had often been bitten by these voracious creatures.

The smaller fish exhibit the same fear of this tyrant, as many of the feathered tribe do of the rapacious birds: while lying dormant near the surface, they sometimes swim round him in vast numbers, and with great anxiety.

If the accounts of different writers on the subject are to be credited, the longevity of the Pike is very remarkable. Gesner mentions a Pike, whose age was ascertained to be 267 years.

Pikes spawn in March or April. When they are in high season, their colours are very fine, being green, spotted with bright yellow, and having the gills of a most vivid red. When out of season, the green changes to gray, and the yellow spots become pale. Though somewhat bony fish, they are in general esteem as food; and on the Continent, where they are caught in great numbers, they are dried, and exported to other countries for sale.

While lying asleep near the surface of the water, they are often caught by means of a snare, at the end of a pole, gently passed over their head; which, by a sudden jerk, draws close, and brings them to land.

The Common Pike are found in considerable numbers in most of the lakes of Europe, and in the northern parts of Persia, where they sometimes measure upwards of eight feet in length.

OF THE MULLET TRIBE.

The lips of these fish are membranaceous, and the lower lip is carinate inwards. They have no teeth in the jaws, but on the tongue and palate only. Above the angle of the mouth there is a hard callus. The gill-membrane has seven incurvated rays. The gill-covers are smooth and rounded.

THE WHITE OR COMMON MULLET*.

There are few parts of the globe which border upon the sea, where the White Mullet are not found. It is one of those species of fish, which, at certain seasons of the year, pass from the sea into the rivers. These they usually enter in the months of May, June, and July. Fresh water is so little injurious to the Mullet, even for permanent residence, that it is said they may even be kept through the whole year, in lakes which have sandy bottoms.

They usually appear in immense shoals, and swim very near the surface of the water. When the fishermen observe an unusual rippling in the water, and also perceive the water at a distance to have a peculiarly blue appearance, they know that a shoal of Mullet is there. The general mode in which these fish are caught, is by seine nets. In some parts of the Continent, the fishermen endeavour, by making violent noises, to drive the fish into their nets; but they are so cunning, that, when surrounded with the net, the whole shoal will sometimes escape; for, if one of them spring over it, the rest, like sheep, are sure to follow their leader. This circumstance was noticed by Oppian.

The Mullet, when encircling seines enclose,
The fatal threads and treach'rous bosom knows :
Instant he rallies all his vigorous powers,
And faithful aid of every nerve implores ;
O'er battlements of cork up-darted flies,
And finds from air the escape that sea denies.

In order to obviate this inconvenience, the fishermen, in some parts of the Continent, use a kind of double net, so formed, that the second net shall catch those fish which overleap the first.

* **SYNONYMS.** *Mugil Cephalus.* *Linnaeus.*—*La Muge cephalé.* *La Cepede.*—*Le Mulet.* *Bloch.*—*Penn. Brit. Zool.* vol. iii. tab. 66.

Mullet are in considerable esteem for the table; and are in best season about the month of August. They are usually eaten boiled; and, on the continent, the most common sauce for them is oil and lemon-juice.

A kind of caviar is made from the roes of the white Mullet. This has the name of *botargue*, and is prepared as follows: When the fish are opened, the roes are taken out and salted. Four or five hours afterwards, they are pressed between two boards, in order to squeeze the water from them. They are then washed in weak brine, and dried in the sun. As this operation takes place in the summer, the caviar becomes perfectly dry and fit for use in the course of ten or fifteen days.

OF THE FLYING-FISH IN GENERAL*.

These fish chiefly inhabit the seas of hot climates; but they are occasionally found within the temperate regions. There are only three known species.

THE COMMON FLYING-FISH†.

The wings, as they are usually denominated, with which these fish have the power of raising themselves into the air, are nothing more than large pectoral fins, composed of seven or eight ribs or rays, connected by a flexible, transparent, and glutinous membrane. They have their origin near the gills, and are capable of con-

* The head is covered with scales, and the mouth is destitute of teeth. The belly is angular, and the pectoral fins are almost as long as the body.

† See Plate xvii. Fig. 5.

DESCRIPTION. This Flying-fish, if we except its head and flat back, has, in the form of its body, a great resemblance to the herring. The scales are large and silvery. The pectoral fins are very long; and the dorsal fin is small, and placed near the tail, which is forked.

SYNONYMS. *Exocoetus volitans*. Linn.—*Hirundo*, of the ancients. Penn. Brit. Zool. vol. iii. tab. 67.—*Le Poisson volant*, in France.

siderable motion backward and forward. These fins are used also to aid the progress of the fish in the water.

The flying-fish has numerous enemies in its own element; the dorado, the thunny, and many others, pursue and devour it. To aid its escape, it is furnished with its long pectoral fins; and, by means of these it is able to raise itself into the air, where it is often seized by the albatross or tropic birds. Its flight is short, seldom more than sixty or seventy yards at a time, but, by touching the surface at intervals to moisten its fins, it is able to double or treble this distance. The whole flight, however, is of so short a duration, that, even in the hottest weather, its fins do not become dry. By touching the water it not only wets its fins, but seems to take fresh force and vigour, for another spring into an element, where it is not long able to support its weight by the motion of its fins. If the Flying-fishes were solitary animals, they would not be worth the pursuit of some of their larger enemies: they are seldom seen to rise singly from the water, but generally appear in large shoals.

It has been inconsiderately remarked; that "all animated nature seems combined against this little fish, which possesses the double powers of swimming and flying, only to subject it to greater dangers. If it escape its enemies of the deep, this is only that it may be devoured by the sea fowl, which are waiting its appearance in the air." Its destiny, however, is not peculiarly severe: we should consider that, as a fish, it often escapes the attacks of birds; and, in its winged character, the individuals frequently throw themselves out of the power of fishes.

The eyes of these fish are so prominent, as to admit of their seeing danger from whatever quarter it may come; but, on emergency, they are able, in addition, to push them somewhat beyond the sockets, so as considerably to enlarge their usual sphere of vision.

They are frequently either unable to direct their

flight out of a straight line, or else they become exhausted on a sudden: for sometimes whole shoals of them fall on board the ships that navigate the seas of warm climates.

In the water, they have somewhat the manner of the swallow in the air, except that they always swim in straight lines; and the blackness of their backs, the whiteness of their bellies, and their forked and expanded tails, give them much the same appearance as that of these birds.

They were known to the ancients; for Pliny mentions them under the name of *Hirundo*, and relates their faculty of flying. They are natives of the European, the American, and the Red Seas; but they are chiefly found in those betwixt the tropics. An individual of this species was, some years ago, caught off the coast of North Wales.

OF THE HERRING TRIBE*.

These fish inhabit the depths of the ocean. They feed on molluscæ, and various kinds of small crustaceous animals, and shell-fish. Three of the species, the Common Herring, the Shad, and the Anchovy, were known to the ancients, and, as articles of food, were held by them in considerable esteem. It is not known that any of these fish are natives of fresh waters. Most of the species are migratory, and generally in immense shoals: and most, if not all of them, are excellent food.

* The bodies of these fish are compressed, and covered with scales; and the belly is extremely sharp, sometimes forming a serrated ridge. In the gill-membrane there are eight rays. The jaws are unequal, and the upper one is furnished with serrated mystaces or connecting bones. The tail is forked.

THE COMMON HERRING

Herrings are found in the greatest abundance in the high northern latitudes. In those inaccessible seas that are covered with ice for a great part of the year, they find a quiet and sure retreat from all their numerous enemies. The quantity of food which those seas supply is immensely great.

Thus remotely situated, and defended by the icy rigour of the climate, they live at ease, and multiply beyond expression, issuing thence in such shoals, that, were all the men in the world to be loaded with herrings, they could not carry off the thousandth part of them. Their enemies, however, are extremely numerous. All the monsters of the deep find them an easy prey; and, in addition to these, the immense flocks of sea-fowl that inhabit the polar regions, watch their outset, and spread devastation on all sides.

In their outset, this immense swarm of living creatures is divided into distinct columns, each five or six miles in length, and three or four in breadth, and in their progress they even make the water ripple before them.

In the month of June they are found about the Shetland islands, whence they proceed to the Orkneys, and, then dividing, they surround the islands of Great Britain and Ireland, and unite again, off the Land's End, in the British Channel, in September. From this part of the ocean the great united body steers south-west, and is not found any more on that side, or in the Atlantic, until the same time in the ensuing year, but next appear off the American coasts. They arrive in Georgia and Carolina about the end of January, and off the coast of Virginia in February. Hence they coast eastward to New England. They then divide, and go into all the

* SYNONYMS. *Clupea harengus*. Linn.—Le Hareng, in France.—Penn. Brit. Zool. tab. 68.

bays, rivers, creeks, and even small streams of water, in amazing numbers, and continue spawning in the fresh water until the end of April, when the old fish return into the sea, where they change their latitudes by a northward direction, and arrive at Newfoundland in May. After this they are no more seen in America till the following spring. Their passing sooner or later up the American rivers, depends on the warmth of the season; and even if a few warm days invite them up, and cool weather succeed, their passage is immediately checked till the heat becomes more powerful. Thus they are found in the British Channel in September, but leave it when the sun is at too great a distance from them, and push forward towards a more agreeable climate. And when the weather in America becomes too warm in May, (after having deposited their eggs,) they steer the course which leads to the cooler northern seas, and, by this careful change of place, they perpetually enjoy the temperature of the climate that is best suited to their nature.

The young Herrings do not follow the old ones in their first migrations; for they are to be seen in great shoals in all the American bays till autumn, when they disappear. Herrings appear to have a natural propensity to keep at a certain distance from the sun; whence we conclude that, at this season of the year, the young ones are led in a direction contrary to that of the old ones, which they meet about latitude 23° north, and 70° west longitude. Here they are supposed to tack about, and follow the others. These, being larger and stronger, come first into the American harbours: their numbers, however, are then considerably diminished by the devastations that have been committed among them during their absence.

The fecundity of the Herring is astonishing. It has been calculated, that if the offspring of a single Herring could be suffered to multiply unmolested and undiminished for twenty years, they would exhibit a bulk ten times the size of the earth. But, happily, Providence

has so contrived the balance of nature, by giving them innumerable enemies, as always to keep them within proper bounds.

In the year 1773, the Herrings, for two months, were in such immense shoals on the Scotch coasts, that it appears, from tolerably accurate computations, no fewer than 1650 boat-loads were taken in Loch Terri-don every night. These would, in the whole, amount to nearly 20,000 barrels.

They once swarmed so excessively on the west side of the isle of Skye, that the numbers caught were more than could possibly be carried away. After the boats were all loaded, and the country round was served, the neighbouring farmers made them up into composts, and manured their ground with them in the ensuing season. This shoal continued to frequent the coast for many years, but not always in numbers equal to these.

Somewhat more than thirty years ago, Herrings came into Loch Urn in such amazing quantities, that, from the narrows to the very head, about two miles, it was quite full. So many of them were pushed on shore, that the beach, for four miles round the head, was covered with them, to the depth of from six to eighteen inches; and the ground under water, as far as could be seen when the tide was out, was equally so. Indeed, so thick and so forcible was the shoal, as to carry before it every other kind of fish; even ground-fish, skate, flounders, &c. were driven on the shore with the first of the Herrings, and perished there.

The principal of the British Herring-fisheries, are off the Scotch and Norfolk coasts; and, in our seas, the fishing is always carried on by nets stretched in the water, one side of which is kept from sinking, by means of buoys fixed to them at proper distances; and, as the weight of the net makes the side sink, to which no buoys are fixed, it is suffered to hang in a perpendicular position, like a screen; and the fish, when they endeavour to pass through it, are entangled in its meshes, from which they cannot disengage themselves. There

they remain till the net is hauled in, and they are taken out.

The nets are seldom stretched for the purpose of catching Herrings, except during the night; for in the dark they are to be taken in much the greatest abundance. When the night is dark, and the surface of the water is ruffled by the wind, the fishermen always assure themselves of the greatest success. Nets stretched in the day-time, are supposed to frighten the fish away.

In order to strengthen the nets, and render the threads more compact, they are all tanned. For this purpose, a quantity of oak bark is boiled: the liquor is then strained off, and further boiled, till it has attained such a consistence, that when a little is dropped on the thumb-nail, it will become thick as it cools. The nets are then put into a large vessel, and this liquor is poured, while hot, upon them. They are suffered to lie four-and-twenty hours, when they are taken out and dried. The same process is repeated three times. Nets that have undergone this operation, are supposed to last thrice as long as they would do without it.

Herrings die almost the moment after they are taken out of the water; whence originated the adage, in common use, *as dead as a Herring*. They also soon become tainted after they are killed. In summer, they are sensibly worse for being out of the water only a few hours; and, if exposed but a few minutes to the rays of the sun, they are perfectly useless, and will not take the salt.

When the fishermen on the Scotch coast have plenty of salt, Herrings sell for about six shillings a barrel. As their salt is expended, the price falls to five, four, three, two, and one shilling per barrel; sometimes even to sixpence or eightpence, below which prices the men will seldom shoot their nets, as a less price is not sufficient to indemnify them for the trouble of catching them. But it sometimes happens that a barrel of fine

fresh Herrings may be purchased for a single chew of tobacco. A barrel contains from six hundred to sixteen hundred fish, according to their size.

After the nets are hauled, the fish are thrown upon the deck of the vessel, and each of the crew has a certain task assigned to him. One part is employed in opening and gutting them; another in salting, and a third in packing them in the barrels in layers of salt. The red Herrings lie twenty-four hours in the brine; they are then taken out, strung by the head on little wooden spits, and hung in a chimney formed to receive them; after which a fire of brushwood, which yields much smoke, but no flame, is kindled under them, and they remain there till they are sufficiently smoked and dried, when they are put into barrels for carriage.

THE PILCHARD*.

About the middle of July, the Pilchards, which are a smaller species of herring, appear in vast shoals off the coasts of Cornwall. These shoals remain till the latter end of October, when it is probable they retire to some undisturbed deep, at a little distance, for the winter. It has been supposed, but improperly, that, like the herring, they migrate into the arctic regions. If Pilchards performed any migration northward, we should have

* **DESCRIPTION.** The chief difference between the Pilchard and the Herring is, that the body of the former is more round and thick; the nose shorter in proportion, turning up; and the under jaw shorter. The back is more elevated, and the belly not so sharp. The scales adhere very closely, whilst those of the herring easily drop off. It is also in general of considerably smaller size. But perhaps the situation of the dorsal fin is as good a criterion as any. This in the Pilchard is so backward, that the fish when held up by it, dips from a horizontal line forward: when the herring is held by its dorsal fin, it remains in equilibrio.

SYNONYMS.—*Clupea pilcardus*. *Turton's Linn.*—Le Pilchard, by the French.—*Penn. Brit. Zool. tab.* 68.

heard of their being occasionally seen and caught on their passage; but of this we have no authenticated instance. The utmost range of the Pilchards seems to be the Isle of Wight in the British, and Ilfracomb in the Bristol Channel. Forty years back, Christmas was the time of their departure: this alteration in time is a very singular fact.

We have the following account of the Pilchard-fishery from Dr. Borlase:—"It employs (he says) a great number of men on the sea, training them thereby to naval affairs; employs men, women, and children, at land, in salting, pressing, washing, and cleaning; in making boats, nets, ropes, and casks. The poor are fed with the offals of the captures, the land with the refuse of the fish and salt; the merchant finds the gains of commission and honest commerce, the fisherman the gains of the fish. Ships are often freighted hither with salt, and into foreign countries with the fish, carrying off, at the same time, part of our tin. From a statement of the number of hogsheds exported each year, for ten years, from 1747 to 1756, inclusive, from the four ports of Fowy, Falmouth, Penzance, and St. Ive's, it appears that Fowy, has exported *yearly* 1732 hogsheds; Falmouth, 11,631 hogsheds and two-thirds; Penzance and Mount's Bay, 12,149 hogsheds and one-third; St. Ive's, 1282 hogsheds: in all amounting to 29,795 hogsheds. Every hogshed, for ten years last past, together with the bounty allowed for exportation, and the oil made out of it, has amounted, one year with another, at an average, to the price of one pound thirteen shillings and three-pence; so that the cash paid for Pilchards exported has, at a medium, annually amounted to the sum of 49,532*l.* 10*s.*"

When Dr. Maton made his tour of the western counties, he and a friend hired a boat to go out and see the Pilchard-fishing at Fowy. He says, that the fishing-boats, which are numerous, are usually stationed in ten fathoms water, and clear of all breakers. Light sail-

boats keep out at a little distance before them, to give notice to the fishermen of the approach of a shoal. Persons are also frequently stationed on the neighbouring rocks, to watch the course of the fish: these are called *huers*, from their setting up a *hue* to the fishermen.

The nets, which are seines, are sometimes two hundred fathoms or more in circumference, and about eighteen fathoms deep. Some of them are said to be capable of holding upwards of two hundred hogsheads of fish, each containing about three thousand. About thirty thousand hogsheads are here considered a tolerably good produce for one season. But it happens now and then, that the fishery almost entirely fails.

The Dog-fish* are great enemies to the Pilchards, often devouring them in amazing numbers.

THE SPRAT† AND SHAD‡.

Sprats are caught on the coasts of the Mediterranean, in such immense shoals, that at a single haul of a large net, as many have sometimes been landed as would have filled betwixt forty and fifty barrels. From the circumstance of these fish being caught near the island of Sardinia in great abundance, and being exported from that island, in barrels, to various parts of the world, they have obtained, in several countries, the name of *Sardine*. Sprats are likewise found in the North Sea and the Baltic.

They usually frequent the deep parts of the sea; but in the autumn they approach the smooth and sandy shores, for the purpose of depositing there their spawn.

* *Squalus catulus*, and *Squalus canicula*, of Linnæus.

† SYNONYMS. *Clupea sprattus*. Linn.—La Sardine. Bloch.

‡ SYNONYMS. *Clupea alosa*. Linn.—L'Alose, in some parts of France.

They come into the Thames about the beginning of November, and leave it in March; and, during that season, as Mr. Pennant remarks, they afford a great relief to the poor people of the capital. At Gravesend and at Yarmouth, they are cured like red herrings. They are also sometimes pickled, and, in this state, are little inferior in flavour to anchovy; but the bones will not dissolve, like those of that fish.

Shads appear in the river Rhine in the month of March; in the Severn and Thames, in April, May, and June; and in the Nile, in December and January. As soon as they arrive, they deposit their spawn in places where the current is most rapid; and, some months afterwards, return to the sea.

They ascend the Rhine as far as Basil, where they are caught in nets, and osier baskets or traps. In order to attract them into the latter, the fishermen use a bait of peas, prepared in a certain way with myrrh: this bait is put into a small bag, and suspended in the inside. When caught by means of lines, an earthworm is used for a bait.

It has been asserted that Shads delight in music, and that they are afraid of storms. They are so little tenacious of life, that, like the herring, they always die as soon as they are taken out of the water.

When these fish are taken out of the sea, they are thin and ill-flavoured; but the longer they continue in the rivers, the fatter and more eatable they become. In the Severn they are considered very delicate fish, especially in that part of the river which flows by Gloucester: here they are usually sold at a price higher than that of salmon. The Thames Shad is esteemed a very coarse and insipid fish. In most countries the males are considered less delicate food than the females.

THE ANCHOVY*.

Like the herrings and the sprats, these fish leave the deeps of the open sea in order to frequent the smooth and shallow places of the coasts, for the purpose of spawning. Betwixt the months of December and March, immense numbers are caught on the shores of Provence, Brabant, and Catalonia: during June and July, in the English Channel, and in the environs of Venice, Genoa, Rome, and Bayonne.

The fishermen generally light a fire on the shore, for the purpose of attracting the Anchovies, when they fish for them in the night. After the Anchovies are cleansed and their heads are cut off, they are cured in a certain way, and packed in small barrels for sale and exportation. The ancient Greeks and Romans prepared from these fish a liquid, which they denominated *garum*, and which was highly esteemed by most of the epicures of that day.

Anchovies are occasionally found both in the North Sea and in the Baltic; but it is supposed that they are in much greater number in the Mediterranean, than in any other part of the world. They have sometimes, though rarely, been caught in the river Dee, on the coasts of Flintshire and Cheshire.

OF THE CARP TRIBE†.

The Carp tribe, for the most part, inhabit fresh waters, where they feed on worms, insects, aquatic plants, fish, and clay or mould. Some of them are migratory. Most of the species, which are very numerous, are found only in the northern countries of Europe; and,

* SYNONYMS. *Clupea encrasicolus*. Linn.—L'Anchois. Bloch.

† The Carp have small mouths and no teeth; and the gill-membrane has three rays. The body is smooth, and generally whitish. On the back there is only one fin.

consequently, were unknown to the ancient naturalists of Greek and Rome.

THE COMMON CARP

In their general habits, these fish exhibit so great a degree of cunning, as sometimes to be called by the country people *River-fox*. When attempted to be taken by a net, they will often leap over it; or immerse themselves so deep in the mud, as to suffer the net to pass over without touching them. They are also very shy of taking a bait; but, during spawning-time, they are so intent on the business of depositing their ova, that they will suffer themselves to be handled by any one who attempts it. They breed three or four times in the year, but their first spawning is in the beginning of May.

Carp are found in the slow rivers and stagnant waters of Europe and Persia; and here principally in deep holes, under the roots of trees, hollow banks, or great beds of flags, &c. They do not often exceed four feet in length, and twenty pounds in weight; but Jovius mentions some, caught in the lake of Como, in Italy, that weighed two hundred pounds each; and others have been taken in the Dneister five feet in length.

From their quick growth and vast increase, these are considered as the most valuable of all fish for the stocking of ponds†; and if the breeding and feeding of them

* **DESCRIPTION.** The form of the Carp is somewhat thick, and its colour blue-green above, greenish yellow mixed with black on the upper part of the sides, whitish beneath, and the tail yellow or violet. The scales are large. On each side of the mouth there is a single beard, and above this another shorter. The dorsal fin is long, extending far towards the tail, which is forked.

SYNONYMS. *Cyprinus carpio*. *Linnaeus*.—*La Carpe*. *Bloch. Penn. Brit. Zool. tab. 70.*

† The roe, when taken out, has frequently been found greater in weight than the whole remainder of the fish.

were better understood, and more practised, than they are, the advantages resulting from them would be very great. A pond stocked with these fish would become as valuable to its owner as a garden. In many parts of Prussia, Carp are bred in great numbers, and are thus made to form a considerable part of the revenue of the principal personages of the country; being sent thence, in well-boats, into Sweden and Russia, where they are very scarce.

By being constantly fed, they may be rendered so familiar as always to come, for food, to the side of the pond where they are kept. Dr. Smith, speaking of the Prince of Condé's seat at Chantilly, says, "The most pleasing things about it were the immense shoals of very large Carp, silvered over with age, like silver fish, and perfectly tame; so that, when any passengers approached their watery habitation, they used to come to the shore in such numbers as to heave each other out of the water, begging for bread, of which a quantity was always kept at hand on purpose to feed them. They would even allow themselves to be handled." Sir John Hawkins was assured by a clergyman, a friend of his, that at the abbey of St. Bernard, near Antwerp, he saw a Carp come to the edge of its pond, at the whistling of the person who fed it.

Carp are very long-lived: the pond in the garden of Emanuel College, Cambridge, contained a Carp that had been an inhabitant of it more than seventy years; and Gesner has mentioned an instance of one that was an hundred years old. They are also extremely tenacious of life, and will live for a great length of time out of water. An experiment has been made by placing a Carp in a net, well wrapped up in wet moss, (the mouth only remaining out,) and then hanging it up in a cellar or some cool place. The fish in this situation is to be fed with white bread and milk, and is besides to be often plunged into water. Carp thus managed have been known not only to live more than a fortnight, but to have grown exceedingly fat, and to have

become far superior in taste to those immediately taken from the pond.

These fish were first introduced into this country about three hundred years ago. Of their sound or air-bladder a kind of fish-glue is made; and a green paint is prepared from their gall.

THE TENCH*.

Tench are partial to foul and weedy waters; and their haunts in rivers are chiefly among weeds, and in places well shaded with rushes. These fish thrive best in standing waters, where they lie under weeds, near sluices and pond-heads. They are much more numerous in pools and pits than in rivers; but those that are caught in the latter, are far preferable for the table. They begin to spawn in June, and may be found spawning in some waters till September. The best season for them is from that time until the end of May.

They do not often exceed four or five pounds in weight. Mr. Pennant, however, mentions one that weighed ten pounds. The Tench is in great repute with us, as a delicious and wholesome food; but in Germany, it is considered a bad fish, and, in contempt, is called *Schoemaker*.

It is singular that the slime of the Tench, is supposed to possess such healing properties among the fish, that, it is said, the pike, on this account, never attempts to devour it, though he seizes, without exception, on all the other species that he is able to overcome. This self-denial of the pike, may, however, be attributed to a more natural cause: Tench are so fond of mud as to be constantly at the bottom of the water, where, proba-

* SYNONYMS. *Cyprinus tinca*. Linn.—*Tinca*. *Ausonius*.
—*La Tanche*. Bloch.

bly, they are secure from the voracious attacks of their neighbour.

Tench are sometimes found in waters where the mud is excessively fetid, and where the weeds are so thick that a hand-net can scarcely be thrust down. In these situations they grow to a large size, and their exterior becomes completely tinged by the mud. Their flavour from this, if cooked immediately on being taken out, is often very unpleasant; but, if they be transferred into clear water, they soon recover from the obnoxious taint.

In November, 1801, a Tench was taken at Thornville Royal, in Yorkshire, of such enormous size, and so singular in its shape, as to be accounted rather a *lusus naturæ*, than a regular production. A piece of water which had been ordered to be filled up, and into which, wood and rubbish had been thrown for some years, was directed to be cleared out. So little water remained, and in such quantity were the weeds and mud, that it was expected no fish would be found, except perhaps a few eels; but greatly to the surprise of the persons employed, nearly two hundred brace of Tench, and as many of Perch, were discovered. After the pond was supposed to be quite cleared, an animal, which the spectators conjectured to be an otter, was observed to lie under some roots. The place was surrounded, and, on making an opening, a Tench of most singular form was found, having literally taken the shape of the hole in which he had for many years been confined. His length was *two feet nine inches*, his circumference two feet three inches, and his weight nearly twelve pounds. The colour was also singular, his belly being tinged with vermilion. This extraordinary fish, after having been examined by many gentlemen, was carefully put into a pond. At first it merely floated, but after a while it swam gently away, though with difficulty. It is probably yet alive.

Tench are foolish fish, and are usually caught by the angler without difficulty. The baits generally adopted

are the small red worms taken out of rotten tan, wasp maggots, or marsh-worms. The season for angling for them is from September to June. They will bite during the greater part of the day, but the expert angler generally attends as early and late as possible.

The food of the Gudgeon consists of aquatic plants, worms, the larvæ of water-insects, and the spawn of fish. They usually swim in small shoals, and are found in gentle streams, where the bed is of sand or gravel. If the bed of the stream be raked or stirred up, they eagerly collect round the spot, and are easily caught with lines baited with small earth-worms. In a village five or six miles from Norwich, the poor people fish for Gudgeons in an adjacent stream. The mode in which this is done is as follows: They cut two spines of the white-thorn, and fixing them at right angles, attach them to a piece of packthread, (having previously put on them a worm,) and fasten the other end to a stick, which they hang over the stream. They sometimes make as many as a hundred of these; and never fail to catch, by means of them, a great number of fish.

The flesh of the Gudgeon is white, of excellent flavour, and easy of digestion. In the months of September and October, these fish are taken in the rivers of some parts of the Continent, in great abundance; and the markets are well supplied with them. They are caught both in nets and with lines.

* **SYNONYMS.** *Cyprinus gobio.* Linn.—Le Goujon. Bloch.—Goujon de la Rivière, in some parts of France.

THE CHUB .

The Chub is a handsome fish ; but it is not in esteem for the table, being very coarse, and, when out of season, full of small, hairy bones. Its name is derived from the shape of its head; and the French and Italians know it by a name synonymous with ours.

Its haunts are rivers, whose bottoms are of sand or clay, or which are bounded by clayey banks; in deep holes, under hollow banks, shaded by trees or weeds. These fish often float on the surface, and are sometimes found in deep waters, where the currents are strong. In ponds fed by rivulets they grow to a great size. They seldom, however, exceed the weight of four or five pounds.

They deposit their spawn in^e April; and are in greatest perfection during the months of December and January.

When the Chub seizes a bait, he bites so eagerly that his jaws are often heard to chop like those of a dog. He, however, seldom breaks his hold, and, when once he is struck, is soon tired. The time of angling is from August to March, but best in the winter months. In mild, cloudy weather, the Chub will bite all day : in hot weather, from sunrise till nine o'clock, and from three in the afternoon till sunset. In cold weather the best time is the middle of the day. The baits are various kinds of worms and flies.

THE DACE †.

The Dace is a gregarious and lively fish ; and during

* SYNONYMS. *Cyprinus cephalus*. Linn.—Chevin. Will.—Nob, or Botling. Daniel.—Penn. Brit. Zool. vol. iii. tab. 73.

† SYNONYMS. *Cyprinus leuciscus*. Linn.—Dace, or Dare. Will.—La Vandoise, in France.

summer is fond of playing near the surface of the water. It is generally found where the water is deep, and the stream is gentle, near the piles of bridges. It also frequents deep holes that are shaded by the leaves of the water-lily; and under the foam on the shallows of streams.

These fish seldom weigh more than a pound and a half; but they are exceedingly prolific. They spawn in March; and are in season about three weeks afterwards. They improve, and are good about Michaelmas, but are best in February. If, when just taken out of the water, they are scotched and broiled, they are said to be more palatable than herrings. Their flesh, however, is generally insipid and full of bones.

Dace afford great amusement to the angler. The baits are various kinds of worms, and the common *flesh-flies*. The season of angling is from April to February, but best in the winter. In hot weather, the time is early and late in the day; in cold weather, during the middle; and in mild, cloudy weather, the whole of the day.

THE ROACH*.

This fish is found chiefly in deep, still rivers, where it is often seen in large shoals. In summer, it frequents shallows near the tails of fords; or lies under banks among weeds, and shaded by trees or herbage, especially where the water is thick. As the winter approaches, these haunts are changed for deep and still waters.

The Roach is so silly a fish, that it has acquired the name of the *Water-sheep*, in contradistinction to the Carp, which from its subtlety is termed the River-fox. *Sound as a Roach*, is a proverb that appears but indif-

* SYNONYMS. *Cyprinus rutilus*. Linn.—Roche. Will.—Penn. Brit. Zool. Frontis. vol. iii.—La Rosse, in France.

ferently founded. It is, however, used by the French as well as by us.

This is a handsome fish, either in the water or when immediately taken out of it. The flesh, although reckoned wholesome, is in little esteem, on account of the great quantity of bones. When Roach are in season, which is from Michaelmas to March, their scales are very smooth; but when they are out of season, these feel like the rough side of an oyster-shell. Their fins also are generally red when the animals are in perfection. They spawn towards the latter end of May, and for three weeks after are unwholesome. They begin to recover in July, but it is Michaelmas before they are eatable. They are said to be best in February or March. The roe is green, but boils red, and is peculiarly good. These fish differ much in quality, according to the rivers in which they are caught. None are good that are kept in ponds.

Roach feed on aquatic plants and vermes. Their usual weight is from half a pound to two pounds. Some, however, have been known to weigh as much as five pounds.

The baits used in catching Roach are various kinds of worms, flies, and pastes. The time for angling is, in mild, cloudy weather, all the day; in hot weather, only in the mornings and evenings; and in cold weather, during the middle of the day.

THE GOLD-FISH*.

Gold-fish are natives of China; and the most beautiful kinds are caught in a small lake in the province of Chekyang, at the foot of a mountain called Tsyen-king. They were first introduced into England about the

* SYNONYMS. *Cyprinus auratus*. Linn.—Kin-yu, in China.—Gold Fish. Penn.—La Dorade Chinoise, in France.

year 1691, but were not generally known till thirty years afterwards.

In China they are kept in ponds, or large porcelain vessels, by almost every person of distinction. In these they are very lively and active, sporting about the surface of the water with great vivacity; but they are so delicate, that, if cannon be fired, or any substance giving out a powerful smell, as pitch or tar, are burned near them, great numbers will be killed. In each of the ponds or basins where they are kept, there is an earthen pan, with holes in it, turned upside down. Under this they retire when, at any time, they find the rays of the sun too powerful. The water is changed three or four times a week. Whilst this is done, it is necessary to remove the fish into another vessel; but they ought always to be taken out by means of a net, for the least handling would destroy them.

When Gold-fish are kept in ponds, they are often taught to rise to the surface of the water at the sound of a bell, to be fed. At Pekin, for three or four months of the winter, or whilst the cold weather lasts, the fish in the ponds are not fed at all. They are able, during that time, to obtain the small quantity of food which they require, from the water. In order to prevent their being frozen, they are often taken into the houses, and kept in china vessels, till the warm weather of spring allows their being returned to their ponds with safety.

In hot countries, Gold-fish multiply very fast, if care be taken to remove the spawn, which swims on the surface of the water, into other ponds; for otherwise, the animals would devour the greater part of it. The young fry, when first produced, are perfectly black; but they afterwards change to white, and then to gold colour. The latter colours appear first about the tail, and extend upwards.

The smallest fish are preferred, not only from their being more beautiful than the larger ones, but because a greater number of them can be kept. These are of

a fine orange red colour, appearing as if sprinkled over with gold-dust. Some, however, are white, like silver, and others white spotted with red. When dead they lose all their lustre. The females are known from the males by several white spots which they have near the gills, and the pectoral fins: the males have these parts very bright and shining.

In China the Gold-fish are fed with balls of paste, and the yolks of eggs boiled very hard. In England, many persons are of opinion that they need no aliment. It is true that they will subsist for a long while without any other food than what they can collect from water frequently changed; yet they must draw some support from animalcules and other nourishment supplied by the water. That they are best pleased by such slender diet may easily be confuted, since they will readily, if not greedily, seize crumbs that are thrown to them. Bread ought, however, to be given sparingly, lest, turning sour, it corrupt the water. They will also feed on the water-plant called duck's-meat, and on small fish.

Gold-fish do not often multiply in very close confinement. If it be desirable to have them bred, they must be put into a tolerably large reservoir, through which a stream of water runs, and in which there are some deep places.

Chondropterygious Fish*.

OF THE STURGEONS IN GENERAL†.

All the species of Sturgeons are inhabitants of the

* The fishes of the order *Chondropterygii*, have cartilaginous gills.

† The head is obtuse; and the mouth, which is quite under

sea, though some of them occasionally go up the wider rivers to spawn. They are of large size, seldom measuring, when full-grown, less than three or four feet in length. The flesh of the whole is reckoned extremely delicious; and to the inhabitants on the banks of the Caspian Sea, and indeed of many other parts both of Europe and America, these fish are very useful as an article of commerce. Their usual food is worms and other fish.

THE COMMON STURGEON*.

The tendrils on the snout of the Sturgeon are three or four inches in length, and have so great a resemblance in form to earth-worms, that, at first sight, they might be mistaken for such. This clumsy, toothless fish, is supposed, by this contrivance, to keep himself in good condition, the solidity of his flesh evidently showing him to be a fish of prey. He is said to hide

the head, is tubular, and without teeth. Between the end of the snout and the mouth there are four cirri, or tendrils; and on each side there is a narrow aperture of the gills. The body is long in proportion to its thickness, and usually angular, having several rows of large bony plates.

* See Plate xvi. Fig. 4.

DESCRIPTION. The body of this fish, which is often found from six to sixteen feet in length, is pentagonal, being armed from head to tail with five rows of large bony tubercles, each of which ends in a strong recurved tip: one of these is on the back, one on each side, and two on the margin of the belly. The snout is long, and obtuse at the end, and has tendrils near the tip. The mouth, which is beneath the head, is somewhat like the opening of a purse, and is so formed, as to be pushed suddenly out, or retracted. The upper part of the body is of a dirty olive colour; the lower part silvery; and the tubercles are white in the middle.

Sturgeons are found both in the European and American seas.

SYNONYMS. *Acipenser sturio*. Linn.—L'Esturgeon, in France.—*Penn. Brit. Zool.* vol. iii. tab. 19.

his large body among the weeds near the sea-coast, or at the mouths of large rivers, only exposing his tendrils. Small fish or sea-insects, mistaking these for real worms, approach in the hope of obtaining food, and are sucked into the jaws of their enemy. The Sturgeon has been supposed by some persons, to root into the mud at the bottom of the sea or rivers; but the tendrils above mentioned, which hang from his snout over his mouth, must themselves be very inconvenient for this purpose; and, as he has no jaws, he evidently lives by suction, and, during his residence in the sea, marine insects are generally found in his stomach.

At the approach of spring, Sturgeons leave the deep recesses of the sea, and enter the rivers to spawn; and from May to July the American rivers abound with them. Here they are often observed to leap to the height of several yards out of the water: this they do in an erect position, falling back again on their sides with such noise, as to be heard in still evenings at a great distance. They have often been known, at these times, to fall into the small boats or canoes of the Indians, and sink them. On this account, it is often dangerous to pass the places that are much frequented by Sturgeons: many instances have occurred of people losing their lives by this means. Some of the Indians take advantage of this propensity, to catch them, by stationing themselves in tolerably large boats, in the places where they are seen, and receiving them as they fall.

In some rivers of Virginia, Sturgeons are found in such numbers, that six hundred have been taken in two days, with no more trouble than putting down a pole, with a hook at the end, to the bottom, and drawing it up again, on feeling it rub against a fish. They are, however, chiefly killed in the night with harpoons, attracted by the light of torches made of the wood of the black pine. On the shores are frequently seen the bodies of Sturgeons that have been wounded with spears, and have afterwards died.

The Indians often, in the day-time, fish for Sturgeons in the lakes. For this purpose there are usually two men to a canoe; one at the stern to work it forward, and the other at the head, with a pointed spear about fourteen feet long, tied to a long cord that is fastened to one of the cross timbers of the canoe. The moment a Sturgeon is seen within reach, the man at the head darts his spear into the tenderest part of the body that he can reach; and, if it penetrate, the fish swims off with astonishing velocity, dragging the canoe along the water after it. If, however, the blow has been correctly aimed, the fish does not go more than two or three hundred yards before he dies; when the men draw up the line and take him. Sometimes, when Sturgeons are seen to lie at the bottom of the still water near the cataracts, they are struck with a spear without a rope, their place being marked, on their rising, by the appearance of the shaft above the water.

The Sturgeon annually ascends our rivers, in the summer, particularly those of the Eden and Esk, but not in great numbers. It is so spiritless a fish, that when caught, as it sometimes is, in the salmon-nets, it scarcely makes any resistance, but is drawn out of the water apparently lifeless. One of the largest Sturgeons ever caught in our rivers, was taken in the Esk, about twenty-six years ago: it weighed four hundred and sixty pounds.

The flesh of the Sturgeon is delicious; and it was so much valued in the time of the Emperor Severus, that it was brought to table by servants with coronets on their heads, and preceded by music. This might give rise to its being, in our country, presented by the Lord Mayor to the king. At present, Sturgeons are caught in the Danube, the Volga, the Don, and other large rivers, for various purposes. The skin makes a good covering for carriages; *caviar* is prepared from the spawn; and the flesh is pickled or salted, and sent all over Europe.

To make *caviar*, the spawn is freed from the little

fibres by which it is connected, washed in white wine or vinegar, and afterwards spread out to dry. It is then put into a vessel and salted, (crushing it down with the hands,) and afterwards enclosed in a canvass bag to drain off the moisture. It is, last of all, put into a tub, with a hole in the bottom, that any remaining moisture may run off, is pressed down, and closed for use.

It has been said, that *isinglass* is made of the skin of the Sturgeon: but this is a mistake; for the Sturgeon is altogether of so cartilaginous a nature, that no part of it will produce isinglass, except the inner coat of the air-bladder. The isinglass most common in our shops, is made from a species of dolphin, called the beluga*.

The bones are said to be so hard, as to serve the American Indians for rasps and nutmeg-graters.

The fecundity of these fish is exceedingly great. Catesby says, that the females frequently contain a bushel of spawn each; and Leeuwenhoek found in the row of one of them no fewer than 150,000,000,000 eggs.

OF THE SHARK TRIBE†.

The animals that compose this rapacious tribe, are entirely marine, and are more frequent in hot than in temperate climates. They are in general solitary, and often wander to vast distances, devouring almost every thing that comes in their way, which they are able to

* *Delphinus leucas*, of Linnæus.

† The body is compressed, long in proportion to the thickness, and tapers toward the tail. The head is obtuse, and on the side of the neck there are from four to seven breathing apertures. The mouth, which is situated in the under part of the head, is armed with several rows of serrated, sharp-pointed teeth of different forms, some of which are fixed, and others moveable. The skin is covered with very slender prickles; and the upper part of the tail is generally longer than the lower.

swallow. Some of them will follow vessels several hundred leagues, for the carcasses and filth that are thrown overboard. The size to which they grow is enormous, as they often weigh from one to four thousand pounds each. Some few species are gregarious, and live on molluscæ and other marine worms. They are all viviparous; their offspring, when first protruded, being enclosed (alive) in a square, pellucid, horny case, terminated at the four corners by long, slender filaments, which are generally found twisted round corallines, sea-weed, and other fixed substances.

Their flesh is altogether so tough, coarse, and of such a disagreeable smell, that even the young-ones are scarcely eatable. Their bodies emit a phosphoric light in the dark. The skin is rough, and is in general use for polishing ivory, wood, and other substances; thongs and carriage traces are also occasionally made of it. The liver is generally found to yield a considerable quantity of oil. There are upwards of thirty species, of which eleven are found in the British seas.

THE WHITE SHARK*.

This dreadful species of Shark has six rows of teeth, hard, sharply-pointed, and of a wedge-like figure. These he has the power of erecting and depressing at pleasure. When the animal is at rest, they are quite flat in his mouth; but, when prey is to be seized, they are instantly erected by a set of muscles that join them to the jaw. Thus, with open mouth, goggling eyes, and large and bristly fins, his whole aspect is an emphatical picture of the fiercest, deepest, and most savage malignity.

It is a -fortunate circumstance, for those who would avoid its attacks, that its mouth is so situated, under

* See Plate xvi. Fig. 5.

SYNONYMS. *Squalus carcharias*. Linn.—La Lamie. Bloch.
—Le Squalo requin. La Cèpede.—Le Requin, in France.

the head, that it has to throw itself on one side in order to seize its prey; for its velocity in the water is so great, that nothing of which it was once in pursuit, would otherwise be able to escape its voracity.

These creatures are the dread of sailors in all the hot climates; for they constantly attend ships, in expectation of what may be thrown overboard; and if, while a Shark is present, any of the men have that misfortune, they inevitably perish.

Increasing still the terrors of the storms,
His jaws horrific arm'd with threefold fate,
Here dwells the direful Shark. Lured by the scent
Of streaming crowds, of rank disease, and death,
Behold! he rushing cuts the briny flood,
Swift as the gale can bear the ship along;
And, from the partners of that cruel trade
Which spoils unhappy Guinea of her sons,
Demands his share of prey, demands themselves.
The stormy fates descend, one death involves
Tyrants and slaves; when straight, their mangled limbs
Crashing at once, he dyes the purple seas
With gore, and riots in the vengeful meal.

The master of a Guinea-ship informed Mr. Pennant, that a rage for suicide prevailed among his slaves, from an opinion entertained by the unfortunate wretches, that, after death, they should be restored to their families, friends, and country. To convince them that their bodies could never be reanimated, he ordered the corpse of one that was just dead, to be tied by the heels to a rope, and lowered into the sea. It was drawn up again as quickly as the united force of the crew could do it; yet, in that short time, the Sharks had devoured every part but the feet, which were secured by the end of the cord.

Persons, while swimming, have often been seized and devoured by Sharks. The late Sir Brooke Watson was, some years ago, swimming at a little distance from a ship, when he saw a Shark making towards him. Struck with terror at its approach, he cried out for assistance. A rope was instantly thrown; and even while

the men were in the act of drawing him up the ship's side, the monster darted after him, and, at a single snap, tore off his leg.

In the pearl-fisheries of South America, every negro, in order to defend himself against these animals, carries with him into the water a sharp knife, which, if the fish offer to assault him, he endeavours to strike into its belly; on which it generally swims off. The officers who are in the vessels, keep a watchful eye on these voracious creatures; and, when they observe them approach, shake the ropes fastened to the negroes, in order to put them on their guard. Many, when the divers have been in danger, have thrown themselves into the water, with knives in their hands, and have hastened to their defence: but too often all their dexterity and precaution have been of no avail.

We are told, that in the reign of queen Anne some of the men of an English merchant-ship, which had arrived at Barbadoes, were one day bathing in the sea, when a large Shark appeared, and sprung forward directly at them. A person from the ship called out to warn them of their danger; on which they all immediately swam to the vessel, and arrived in perfect safety, except one poor man, who was cut in two by the Shark, almost within reach of the oars. A comrade and intimate friend of the unfortunate victim, when he observed the severed trunk of his companion, was seized with a degree of horror, that words cannot describe. The insatiable Shark was seen traversing the bloody surface in search of the remainder of his prey, when the brave youth plunged into the water, determining either to make the Shark disgorge, or to be buried himself in the same grave. He held in his hand a long and sharp-pointed knife, and the rapacious animal pushed furiously towards him: he had turned on his side, and had opened his enormous jaws, in order to seize him, when the youth, diving dexterously under, seized him with his left hand, somewhere before the upper fins, and stabbed him several times in the belly. The Shark,

enraged with pain and streaming with blood, plunged in all directions in order to disengage himself from his enemy. The crews of the surrounding vessels saw that the combat was decided; but they were ignorant which was slain, until the Shark, weakened by loss of blood, made towards the shore, and along with him his conqueror; who, flushed with victory, pushed his foe with redoubled ardour, and, by the aid of an ebbing tide, dragged him on shore. Here he ripped up the bowels of the animal, obtained the severed remainder of his friend's body, and buried it with the trunk in the same grave. This story, however incredible it may appear, is related in the History of Barbadoes, on the most satisfactory authority.

The West India negroes often venture to contend with the Shark in close combat. They know his power to be limited by the position of his mouth underneath; and, as soon as they discover him, they dive beneath, and, in rising, stab him before he has an opportunity of putting himself into a state of defence. Thus do boldness and address unite in triumph over strength and ferocity.

The South Sea islanders are not in the least afraid of the Sharks, but will swim among them without exhibiting the least signs of fear. "I have seen," says Captain Portlock, "five or six large Sharks swimming about the ship, when there have been upwards of a hundred Indians in the water, both men and women: they seemed quite indifferent respecting them, and the Sharks never offered to make an attack on any of these people, and yet at the same time would greedily seize our baits; whence it is manifest that these people derive their confidence of safety from their experience, that they are able to repel the attacks of those devouring monsters."

An Indian, on the coast of California, on plunging into the sea, was seized by a Shark; but, by a most extraordinary feat of activity, he cleared himself, and, though much wounded, threw blood and water at the

animal, to show his bravery and contempt. But the voracious monster seized him with horrid violence a second time, and in a moment dragged him to the bottom. His companions, though not far from him, and much affected by the loss, were not able to render him any assistance.

We are told that, notwithstanding the voracity of these creatures, they will not devour any feathered animal that is thrown overboard; but that they will readily take a bait of a piece of flesh fastened on an iron crook. They are so tenacious of life, as to move about long after their head is cut off.

Their flesh is sometimes eaten by sailors on long voyages; and, though exceedingly coarse and rank, it is generally considered better than that of any others of the tribe. The skin is rough, hard, and prickly; and, when properly manufactured, is used in covering instrument cases, under the name of *shagreen*.

THE BASKING SHARK*.

This species has derived its name from its propensity to lie on the surface of the water, as if to bask itself in the sun. Though a very large fish, it possesses none of the voracity and ferociousness that mark the generality of the Shark tribe. It will frequently lie motionless on the surface of the water, generally on its belly, but sometimes on its back; and it seems so little

* DESCRIPTION. Its body is slender, and from three to twelve yards in length, of a deep lead-colour above, and white below. The upper jaw is blunt at the end, and much longer than the lower. The mouth is placed beneath, and furnished with small teeth; those before much bent, and the remote ones conical and sharp-pointed. On each side of the neck there are five breathing apertures. There are two dorsal, two pectoral, two ventral fins, and one small anal fin. Within the mouth, near the throat, is a short kind of whalebone.

SYNONYMS. *Squalus maximus*. Linn.—*Le Squale très-grand*. La Cépède.—Sun-fish. Smith's Hist. Cork.—Penn. Brit. Zool. vol. iii. tab. 13.

afraid of mankind, as often to suffer itself to be patted and stroked.

The Basking Sharks frequent our seas during the warm summer months, and are not uncommon on the Welsh and Scottish coasts, coming in shoals usually after intervals of a certain number of years. In the intervening summers, those that are seen on the Welsh coast, are generally single fish, that have probably strayed from the rest. They appear in the Frith of Clyde, and among the Hebrides, about midsummer, in small droves of seven or eight, or more commonly in pairs. Here they continue till the latter end of July, when they disappear.

Their food seems to consist entirely of marine-plants, and some of the species of medusæ. They swim very deliberately, and generally with their upper fins above water. Sometimes they may be seen sporting about among the waves, and leaping several feet above the surface.

Their liver is of such immense size, as frequently to weigh nearly a thousand pounds. From this a great quantity of good oil may be extracted; so much, indeed, that the oil of a single fish will sometimes sell for twenty or thirty pounds sterling.

The inhabitants of the northern coasts of Europe are very alert in the pursuit, and very dexterous in the killing, of these fish. When pursued, the Basking Shark does not accelerate its motion, till the boat comes almost in contact with it, when the harpooner strikes his weapon into its body, as near the gills as he can. These animals seem not to be very susceptible of pain; for they often remain in the same place, till the united strength of two men is exerted to force the harpoon deeper. As soon as they perceive themselves wounded, they plunge headlong to the bottom; and frequently coil the rope round their bodies in agony, attempting to disengage themselves from the fatal instrument, by rolling on the ground. Discovering that these efforts are in vain, they swim off with such amazing rapidity,

that one instance has occurred of a Basking Shark towing to some distance a vessel of seventy tons burden, against a fresh gale. They sometimes run off with two hundred fathoms of line, and two harpoons in them; and will employ the men from twelve to twenty-four hours before they are subdued.

As soon as they are killed, the fishermen haul them on shore; or, if at a distance from land, to the vessel's side, to cut them up and take out the liver, which is the only useful part of their bodies. This is melted into oil, in kettles provided for the purpose; and, if the fish be a large one, it will yield eight barrels or upwards.

So excessively voracious are these animals, that they are altogether fearless of mankind. They follow vessels with great eagerness, seizing with avidity every thing eatable that is thrown overboard; and they have sometimes been known to throw themselves on fishermen, and on persons bathing in the sea. As, however, they are smaller and more weak than most other sharks, they do not attack their more exposed enemies by open force. In combating them, it is necessary to have recourse to stratagem. They, consequently, for this purpose, conceal themselves in mud, and lie in ambush, like the rays, until they have an opportunity of acting offensively with success. Their usual food consists of fish and other marine animals, of which they destroy immense numbers.

On the coasts about Scarborough, where the Haddocks, Cod, and Dog-fish are in great abundance, the fishermen universally believe, that the Dog-fish make a line or semi-circle, to encompass a shoal of haddocks

* **SYNONYMS.** *Squalis canicula.* *Linnæus.*—La Rousette tigrée. *Bloch.*—Spotted Dog-fish. *Pennant.*—Greater Cat-fish. *Edwards.*—Rough Hound, in Scotland.

and cod, confining them within certain limits near the shore, and eating them as occasion requires. Haddocks and cod are always found near the shore, without any Dog-fish among them, and the Dog-fish are found further off, without any haddocks, or cod; and yet the former are known to prey upon the latter, and, in some years, they devour such immense numbers, as to render this fishery more expensive than profitable.

These fish are found in the seas of all climates, both hot and cold: they equally abound on the coasts of Great Britain, Norway, the Cape of Good Hope, and the Canary Islands; and of those countries which lie immediately under the equinoctial line.

Their flesh is hard and disagreeable to the taste, diffusing also a strong odour, which somewhat resembles that of musk. Their dried skins constitute the well-known article of commerce called *shagreen*, or the *skin of the Dog-fish*. The small and hard tubercles with which these are covered, render them useful in the polishing of wood, ivory, and even of iron. A considerable quantity of oil may be extracted from the livers of Dog-fish.

OF THE RAY TRIBE*.

The Rays are entirely confined to the sea; and, from being destitute of an air-bladder to buoy them, they live altogether at the bottom, and chiefly in deep water. They subsist on shell-fish, or any animal substances that come in their way. Some of them become of a size so large, as to weigh two hundred pounds and upwards; in which case they are sometimes dangerous

* The bodies of these fish are broad, thin, and flat. The mouth is situated beneath, and the eyes above the body. The breathing apertures are five on each side, a little below the mouth. The head in general is small and pointed, and not distinct from the body.

enemies to man, whom they are said to destroy, by getting him down, lying upon, and devouring him. They seldom produce more than one young-one at a time. This, as in the Sharks, is enclosed in a four-cornered bag or shell, which ends in slender points; but which does not (as in those) extend into long filaments. The liver is large, and often produces a great quantity of oil.

In a fresh state, most of the Rays have a fetid and unpleasant smell, but nearly the whole are eatable. There are about *twenty* species. Those with which we are best acquainted, are the Skate, the Thornback, and the Torpedo, or Electric Ray.

THE TORPEDO, OR ELECTRIC RAY*.

Torpedos are partial to sandy bottoms, in about forty fathoms of water, where they often bury themselves by flinging the sand over them, with a quick flapping of all their extremities. In Torbay they are generally caught like other flat-fish, with trawl-nets; and instances have occurred of their seizing a bait.

This fish possesses the same property of benumbing its prey, as that already described in the electric

* See Plate xvi. Fig. 6.

DESCRIPTION. These fish, which are sometimes so large as to weigh betwixt seventy and eighty pounds, are nearly of a circular form, two or three inches thick in the middle, and attenuating to extreme thinness on the edges. The skin is smooth, of a dusky brown colour above, and white underneath. The ventral fins form on each side, at the end of the body, nearly a quarter of a circle. The tail is short, and the two dorsal fins are near its origin. The mouth is small, and, as in the other species, there are on each side below it five breathing apertures.

Torpedos are found in most of the European seas, and are by no means uncommon on the British coasts.

SYNONYMS. *Raia Torpedo.* Linn.—Torpedo, Cramp-fish. *Willoughby Ich.*—Electrical Ray. Penn.—La Torpille. Bloch.—La Raie Torpille. *La Cepede.*—Poule de Mer, Tremoise, in some parts of France.—Penn. Brit. Zool. vol. iii. tab. 10.

eel; and, when it is in health and vigour, the shock that it communicates is very severe: but its powers always decline as the animal declines in strength; and when it expires, they entirely cease. In winter these fish are also much less formidable than during warm weather.

Dr. Ingenhousz had for some time, in a tub of seawater, a Torpedo which, from its being during winter, seemed to be feeble. On taking it into his hands, and pressing it on each side of the head, a sudden tremor, which lasted for two or three seconds, passed into his fingers, but extended no further. After a few seconds, the same trembling was felt again; and again several times, after different intervals. The sensation, he says, was similar to that which he should have felt by the discharge of several small electrical bottles, one after another, into his hand. The shocks sometimes followed each other very quickly, and increased in strength towards the last. Probably, from the weakness of the fish, the shock could not be communicated through a brass chain, though the usual contortion was evidently made. A coated vial was applied to it, but could not be charged.

From some experiments that were made by Mr. Walsh, on a very stout and healthy Torpedo, it appears that, although it seemed to possess many electric properties, yet no spark whatever could be discovered to proceed from it, nor were pith-balls ever found to be affected by it. When it was insulated, it gave a shock to persons likewise insulated, and even to several that took hold of each other's hands: this it did forty or fifty times successively, and with very little diminution of force. If touched only with one finger, the shock was so great as to be felt in both hands. Each effort was accompanied by a depression of the eyes, which plainly indicated the attempts that were made upon non-conductors. Although the animal was in full vigour, it was not able to force the torpedinal fluid across the minutest tract of air, not even from one link

of a small chain freely suspended to another, nor through an almost invisible separation made by a penknife in a slip of tin-foil pasted on sealing-wax.

In the general structure of its body, the Torpedo has not been found to differ materially from the rest of the Rays. The electric organs are placed one on each side of the cranium and gills, reaching thence to the semicircular cartilages of each great fin, and extending longitudinally from the anterior extremity of the animal to the transverse cartilage which divides the thorax from the abdomen : and within these limits they occupy the whole space between the skin of the upper and under surfaces. Each organ is attached to the surrounding parts by a close cellular membrane, and also by short and strong tendinous fibres, which pass directly across from its outer edge to the semicircular cartilages. They are covered above and below with the common skin of the animal, under which there are longitudinal fibres spread entirely over them. Each organ is about five inches in length, and at the anterior end about three in breadth. They are composed of perpendicular columns, reaching from the upper to the under surface, varying in length according to the thickness of the parts of the body, from an inch and a half to half an inch ; and their diameters are from a fourth to a fifth of an inch.

The coats of the columns are very thin, and almost transparent. The number of columns in each organ varies considerably in different animals. That of one which Mr. Hunter presented to the Royal Society was about 470 : but in a very large Torpedo, the number of columns in one organ was 1182. These columns were composed of films parallel to the base of each, and the distance between each of the columns was the 150th part of an inch. If we suppose these films to be charged with electricity, and to be the 300th part of an inch thick, and a middling-sized Torpedo to contain in both organs, on the whole, 1000 columns each an inch long, and 0.03 square inches area at the

base, then $1000 \times 150 \times 0.3 = 4500$ square inches. Now it has been clearly proved that the capacity of stout glass is thirty-six times less than that of these organs: therefore, both the organs of a middling-sized Torpedo will be equivalent to $4500 \times 36 = 162,000$ square inches, or 1125 square feet of glass. The nerves inserted into each organ, arise by three very large trunks from the lateral and posterior part of the brain. These, having entered the organs, ramify in every direction between the columns. Their number and magnitude are extremely great; and it is supposed that they are subservient to the formation, collection, and management of the torpedinal fluid.

The Torpedo brings forth its young-ones in the autumn.

THE SKATE * AND THORNBACK †.

The Skate is the largest, and at the same time the most useful fish of its tribe. Its flesh is white, firm, and good. In some parts of the Continent, where these fish are caught in great abundance, they are dried for sale. The best season for Skate is the spring of the year. They sometimes attain a very large size. Willughby speaks of one so huge, that it would have served 120 men for dinner.

From the month of May until the beginning of

† See Plate xvii. Fig. 6.

DESCRIPTION. The principal difference between the Skate and the Thornback, consists in the former having sharp teeth, and a single row of spines upon the tail; whilst the latter has blunt teeth, and several rows of spines, both upon the back and tail.

SYNONYMS. *Raia batis*. Linn.—*La Raie batis*. *La Cepede*. *La Rai cendrée*. Bloch.—*Flassade*, *Couverture*, *Vachemarine*, in some parts of France.—*Skate*, or *Flaire*. Willughby — Penn. Brit. Zool. vol. iii. tab. 9.

† **SYNONYMS.** *Raia clavata*. Linn.—*La Raie bouclée*. *La Cepede*. Bloch.—*Raie Clouée*, *Clavelade*, in some parts of France.—Penn. Brit. Zool. vol. iii. tab. 11, 12.

September, the females are occupied in producing their offspring. This they usually do on coasts and in places where they are liable to little interruption. Each of the young-ones is enclosed in an oblong, angular bag, about half an inch thick in the middle. These are called *purses* by the fishermen. After the fish have escaped, the empty bags are frequently cast ashore by the tide; and they are very common on all our coasts.

Dr. Monroe has remarked, that in the gills of a large Skate there are upwards of 144,000 subdivisions, or folds; and that the whole extent of this membrane, whose surface is nearly equal to that of the whole human body, may be seen, by a microscope, to be covered with a net-work of vessels, that are not only extremely minute, but exquisitely beautiful.

In all its habits the *Thornback* resembles the Skate, except as to the time in which its offspring are produced. This is usually about the months of June and July; during which time these fish are caught in great numbers.

We are informed by M. Bloch, that near the island of St. Christopher, in the year 1634, a *Thornback* was caught which measured twelve feet in length, and nearly ten in width.

The flesh of the *Thornback* is inferior to that of the Skate. It is sometimes eaten in England, but is generally sold at a low price. The young-ones, however, which have the denomination of *Maids*, are reckoned delicate eating. The Norwegian fishermen catch *Thornbacks* principally on account of their livers, from which they extract a considerable quantity of oil.

THE STING-RAY, OR FIRE-FLAIRE*.

The ancient naturalists have described the caudal

* See Plate xvi. Fig. 7.
DESCRIPTION. The Sting-ray is nearly of a round shape.

